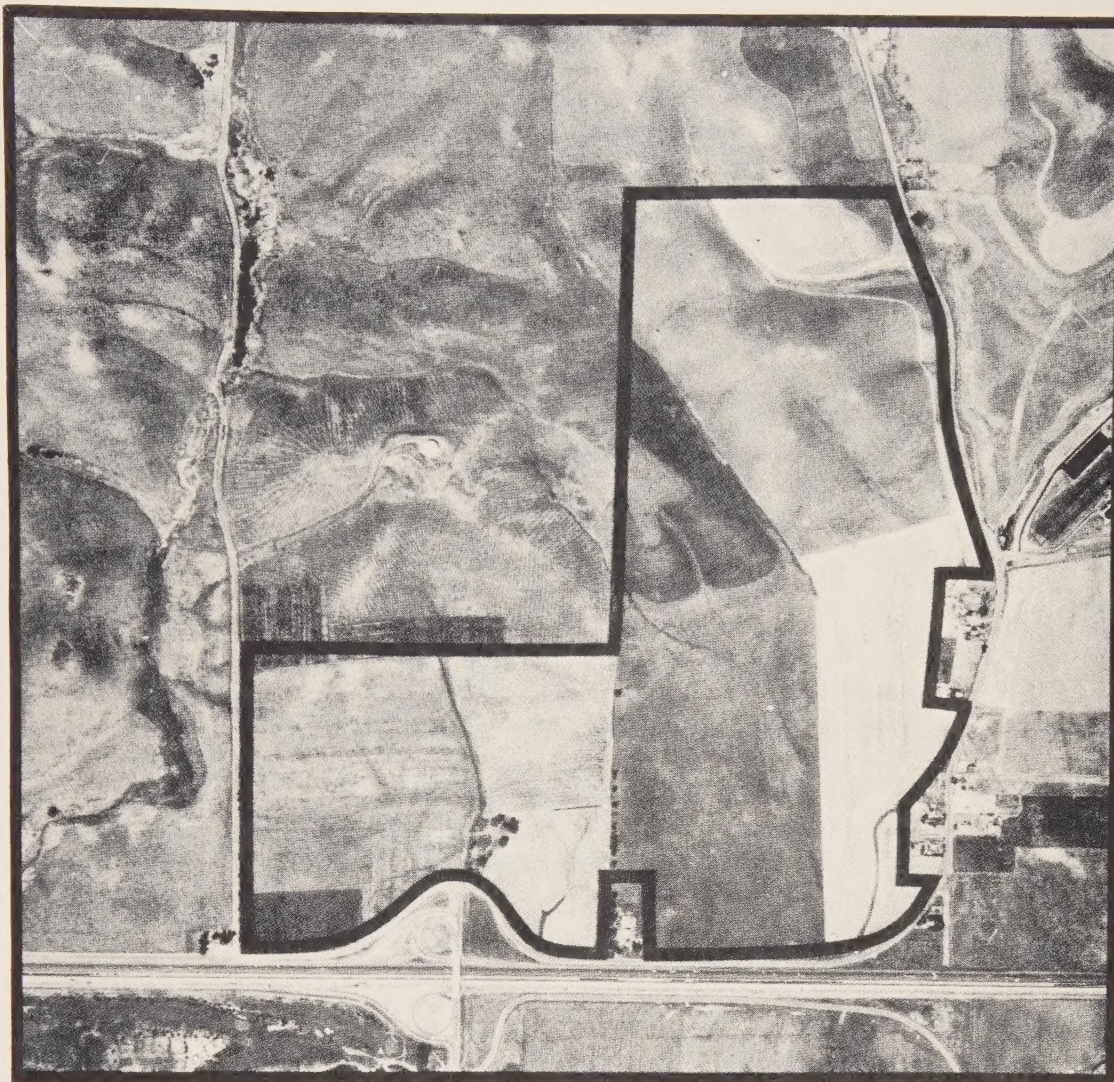


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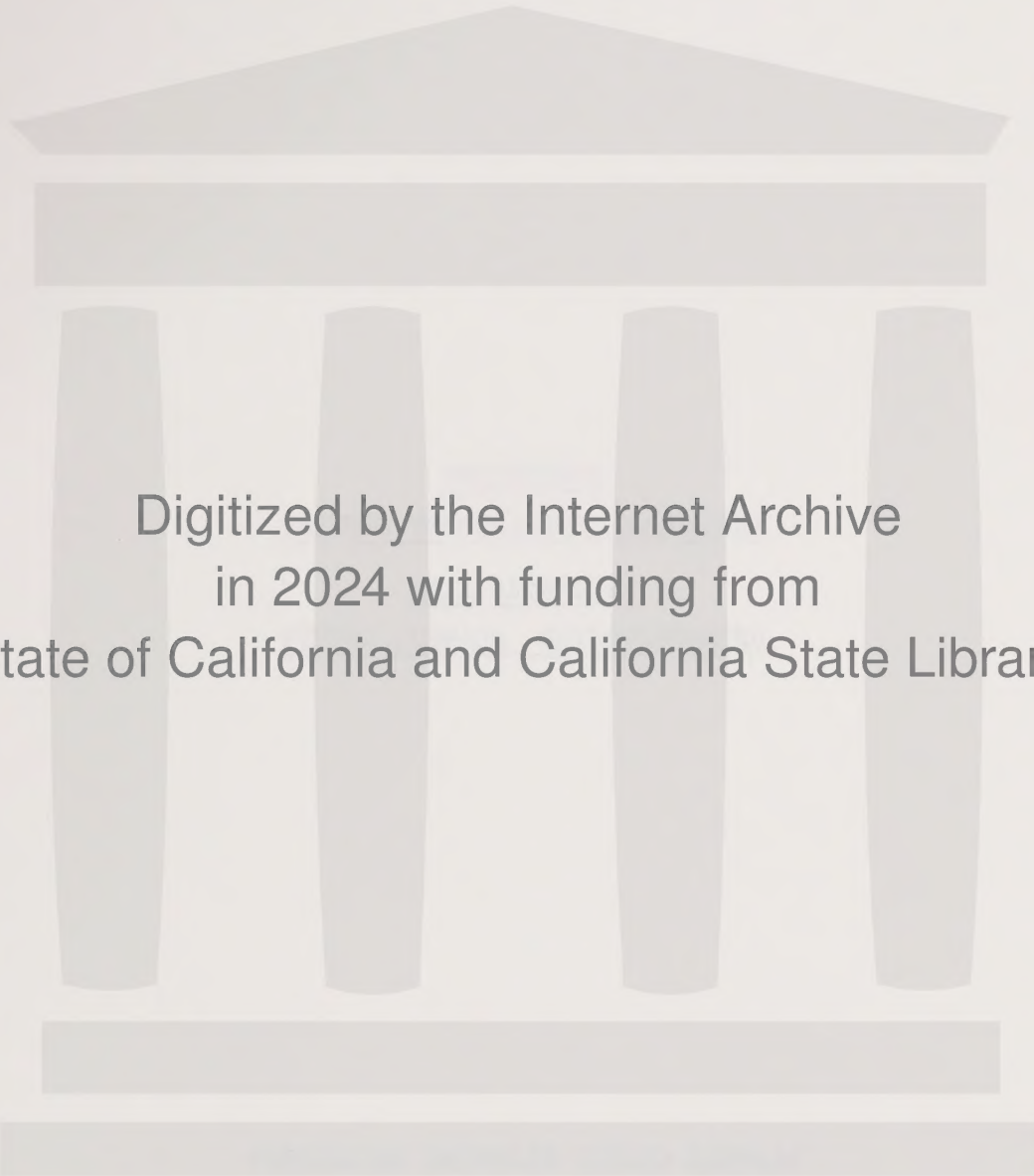
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DRAFT
ENVIRONMENTAL IMPACT REPORT

NORTHBLUFF
BROADMOOR DEVELOPMENT COMPANY
LIVERMORE AREA
UNINCORPORATED ALAMEDA COUNTY

ALAMEDA COUNTY PLANNING DEPARTMENT
NOVEMBER, 1981



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SUMMARY

Broadmoor Development Company has petitioned Alameda County to rezone a 393 acre site from the A (Agriculture) to the PD (Planned Development) District, located north of I-580 between Doolan Canyon Road on the west and Collier Canyon Road on the east, northwest of Livermore, unincorporated Alameda County. Planned Development rezoning would permit development of 1,750 dwelling units, a 6-acre commercial area, an elementary school, a sewage treatment plant and disposal system, and a recreation center. About 1/3 of the site would remain in open space. Urban services would be provided either through extension of existing services by present providers or through a proposed County Service Area. The project is named Northbluff.

Significant impacts identified in this Draft Environmental Impact Report, and mitigation measures (where available) which could reduce the impacts, include:

1. Presence of expansive soils on site could lead to structural damage.
Mitigation: Use pier and grade beam or deeper than normal foundations in areas with expansive soils.
2. Strong ground shaking during earthquakes could cause structural damage.
Mitigation: Adherence to Uniform Building Code provisions can reduce damage but all construction in California is subject to damage from a major earthquake.
3. Prime grazing land would be lost through coverage with urban development.
No mitigation is possible if the project is approved.
4. The proposed sewage treatment plant site is subject to flooding. Mitigation: Floodproof the plant, improve drainage to remove the area from flood hazard, or move the plant to another location.
5. Existing storm drainage facilities under I-580 may not be able to handle increased runoff the project would generate. Mitigation: Verify capability of facilities; improve them if shown to be necessary.
6. Potential for erosion and sedimentation due to grading. Mitigation: Require adherence to a strong erosion and sedimentation control plan. Prohibit rainy season grading.
7. Degradation of downstream water quality due to introduction of urban runoff pollutants. Mitigation: Efficient street sweeping. Some degradation is inevitable.
8. The project would make attainment of air quality standards in the Livermore-Amador Valley more difficult, although it would not, by itself, cause standards to be exceeded locally. Mitigation: Consists of strategies to reduce vehicle miles traveled. Impact is inevitable due to project's distance from employment, shopping, school destinations.

9. High energy consumption per unit of housing. Mitigation: Partial mitigation through incorporating conservation features in homes, use of solar power, exploration of wind power for the project. Transportation energy use unmitigably high due to project's distance from employment, shopping, school destinations. Sewage treatment system would require high energy use.
10. Congestion would occur with the project in combination with proposed Las Positas New Town. Mitigation: Various road improvements, as detailed in the transportation/circulation section, would fully mitigate impacts from Northbluff alone. Impacts due to the combined projects, such as freeway congestion, are mostly due to Las Positas.
11. Sewage treatment system proposed presents unknown risks to groundwater quality depending upon its efficiency and reliability compared to conventional systems. Unmitigable.
12. Inefficiency of providing certain services serving Northbluff alone; increased costs to future residents for fire protection, sewage disposal, inefficient use of resources to construct infrastructure. Inefficiency compounded if Las Positas is constructed. Unmitigable due to project's location and unavailability of most services and urban infrastructure. Could consider project together with Las Positas New Town proposal.
13. Inefficiency of wastewater management in the Valley. Introduction of new entity responsible for wastewater management with no provision for coordination with other agencies or master plan for providing the service to other unincorporated areas. Mitigation: Delay project until overall management plans can be formulated.
14. Marginal fire protection for project until sufficient build-out is attained to construct a fire station on the site. Unmitigable due to site's distance from existing fire stations.
15. City of Livermore mutual aid agreements with County fire and police services could be jeopardized due to perceived increase in imbalance for City and City's indications of unwillingness to enter into agreements concerning Northbluff.
16. Some adverse aesthetic impact due to cutting proposed into the base of the hills. Mitigation: Adjust grading to better fit existing contours.
17. Adverse impacts for future residents from freeway noise. Mitigation: Construct 12' sound wall along southerly property boundary or set units well back from southerly property line.
18. Potential conflict of project with operations of Livermore Municipal Airport in terms of noise and safety. Mitigation: Essentially unmitigable. Noise easements could be required.
19. Conflict with local, regional, and state plans and policies which give

highest development priorities to infill areas where urban infrastructure and services are more readily available. Unmitigable. Not an environmental impact per se, but causes impacts of increased energy consumption, vehicle miles traveled, air pollution, inefficiency in resource use, increased costs to future residents, etc.

20. Potential growth inducing impact on adjacent lands due to conflicts between the project and existing agricultural uses and availability of urban services and infrastructure. Potential growth inducement for other agricultural lands through precedent set for extending services, building and maintaining/operating sewage system, etc. Mitigation: Adjacent lands should be examined for development potential and project facility planning performed in accordance with potential. Strict adherence to General Plan policies can mitigate growth inducement on other isolated sites.

The "No Project" alternative would obviously eliminate all adverse impacts. A similar project in an infill location or where urban infrastructure and services were already available would have less impacts related to need for constructing new infrastructure and setting up new service deliverers, including air quality, energy, resource inefficiency, cost to future homeowners, etc. Industrial development on the site would be more compatible with the airport, have less noise impacts, would still require sewage treatment facilities and fire protection. Annexation of the site to Livermore and development as proposed would involve similar physical impacts but greater efficiencies in service provision, although not as much improvement as infill housing would provide. Alternative project concepts were found to be infeasible or to increase impacts.

Impacts, mitigation measures, and alternatives summarized briefly above are discussed fully in the text, along with the project's setting, and THIS SUMMARY SHOULD NOT BE USED AS A SUBSTITUTE FOR READING THE FULL TEXT OF THIS REPORT for those wishing full understanding of the project and its implications.

I. INTRODUCTION

The County of Alameda has been requested to approve rezoning of a 393 acre site from A (Agricultural) District to the PD (Planned Development) District, located north of I-580 between Doolan Canyon Road on the west and Collier Canyon Road on the east, northwest of Livermore, unincorporated Alameda County. Reclassification to the PD District is requested by Broadmoor Homes to construct a development called Northbluff, consisting of 1,750 Dwelling units, a 6-acre local commercial area, an elementary school, a sewage treatment plant and disposal system, and a recreation center. About 1/3 of the site is proposed to remain in open space. Urban services would be provided either through extension of existing services by present providers or through a proposed County Service Area. Refer to the Project Description section of this report for details of the proposal.

This Environmental Impact Report is being prepared by Alameda County Planning Department in accordance with the requirements of the California Environmental Quality Act of 1970 (CEQA), as amended, and State and County implementing guidelines, for consideration by the Alameda County Planning Commission, Board of Supervisors, Local Agency Formation Commission, and other Responsible Agencies prior to action on the project. Project Manager is Paul Deutsch; text is by Paul Deutsch; Adolph Martinelli; David W. Carpenter (consulting Engineering Geologist) who prepared the geology, soils, and seismicity sections; Sara Pandl (energy); and Brian Welch (soils). Bruce Fry and Adolph Martinelli are responsible for overall direction and editing of EIRs. Graphics were prepared by Sara Pandl.

Portions of the report are based on information submitted by various consultants. These include Phillips Brandt Reddick (air quality), overall project planners; DKS Associates (transportation/circulation); Angus McDonald & Associates (fiscal); Lowry & Associates (sewage treatment); and Archeological Resource Management (archeology). Purcell, Rhoades & Associates are geologic consultants for the applicants. Many of the illustrations in this report are based on originals from these sources and their background reports, on file with the Alameda County Planning Department, are available for reviewers of this report who need further information in these particular areas.

II. PROJECT DESCRIPTION

The project consists of rezoning from the A (Agriculture) District to permit a Planned Development (PD) comprising 1,750 residential dwelling units, a recreation center, a local commercial area, an elementary school, a sewage treatment plant, and open space on a 393 acre site located north of I-580 between Doolan Canyon Road and Collier Canyon Road, northwest of Livermore, unincorporated Alameda County. Refer to the Land Use and Development Plan and other exhibits at the end of this report. Tentative Tract maps would be submitted if rezoning were approved to permit actual subdivision of the site. Applicant is Broadmoor Development Company, Oakland, California, who has titled the project Northbluff. Lowest

density residential development is proposed for the northwest portion of the site; the northeast portion would contain zero-lot-line residences. Higher density townhouses and condominiums are proposed for the southerly part of the site. A local commercial area is proposed just north of a new Collier Canyon Road/I-580 interchange. The elementary school is shown on the north side of a major loop collector street in the southeastern portion of the site. The sewage treatment plant is proposed to be located in the extreme southeast corner of the site, where the existing Collier Canyon Road turns northward. A landscape buffer area is shown between I-580 and residential development, and on both sides of a new Collier Canyon Road, which would function as the major arterial serving the project, connecting the freeway interchange with the existing entrance to Chabot College Valley Campus. Development is proposed to be phased over a six-year period. (Refer to Phasing Plan, Figure 5.) Development would be confined to the flatter, southerly two-thirds of the site. Project population upon completion would be about 4,550 - 4,850. Considerable new infrastructure and unusual operating costs would be necessary to serve the project, as detailed later in this section.

A. Housing Types and Buildings

Table 1 summarizes the housing types, cost, unit breakdown, population, and phasing of the project. Conventional detached residential units are proposed at a density of 3.3/acre; zero-lot-line units at 5.6/acre; townhouses at 15/acre; and condominiums at 25/acre. Six acres of commercial area are proposed to serve primarily the project with 78,400 sq. ft. of building space. The Land Use and Development Plan, Figure 4, contains a statistical summary of land uses and acreages.

B. Access and Circulation

Major access to the site would be provided by I-580 via the Airway Boulevard/Collier Canyon Road interchange. Collier Canyon Road is proposed to be reconstructed by the developer as a major arterial linking the freeway Interchange with the entrance to Chabot College Valley Campus via a northwesternly traverse of the site. The Interchange with the freeway would be modified. Applicant proposes abandoning the existing offramp, and using a portion of the existing Collier Canyon (frontage) Road as on- and off-ramps. A portion of the existing Collier Canyon (frontage) Road immediately east of Doolan Canyon Road would be abandoned, with access to Doolan Canyon Road provided via a major residential collector road within the project which would cross the new Collier Canyon Road just north of the Interchange and loop through the southerly and easterly portions of the project site. (See Land Use and Development Plan.) East of the Interchange a portion of the existing Collier Canyon Road would be retained as access to an existing residence. Existing residences on Collier Canyon Road would receive access through the project via a large clockwise loop. Modifications to the freeway Interchange must be approved by the

Table 1

LAND USE AND PHASING
NORTHBLUFF DEVELOPMENT

Unit of Measure	<u>Single Family</u>			<u>Multi-Family</u>		
	<u>Total Residential</u>	<u>Detached</u>	<u>Zero Lot Line</u>	<u>Townhouse</u>	<u>Condominiums</u>	<u>Commercial</u>
Value of Product (1980\$)	111,500 (average)	\$150,000	\$125,000 to \$153,000	\$109,000 to \$125,000	\$ 89,000	\$100 per sq. ft.
Total No. of Units	1,750	151	444	915	240	78,400 sq. ft.
Population - Per DU (average)	2.6	2.75	2.60	2.65	2.15	
Total Students - K-6 per DU	4,510	415	1,154	2,425	516	
(average)	0.25	0.4	0.4	0.2	0.1	
7-12 per DU (average)	0.23	0.4	0.4	0.17	0.08	
Total K-6	446	61	178	183	24	
7-12	404	60	178	156	10	
Total No. of Students	850	121	356	339	34	

PHASING

Construction Phase

<u>YEAR</u>						
1982/3	239	70	79	90		2 Acres
1983/4	398	81	137	180		2 Acres
1984/5	407		77	330		2 Acres
1985/6	220		55	165		
1986/7	361		96	150	115	
1987/88	125				125	
1988/9	-0-					
Build-out						
Total	1,750	151	444	915	240	6 Acres

Source: Broadmoor Development Company, Alameda County Planning Department, Livermore Unified School District and McDonald & Associates.

California Department of Transportation and the Federal Highway Administration. Collier Canyon Road is proposed as a four-lane divided arterial with a 96' right-of-way, a landscaped median, and landscaped buffers on both sides, and a parallel bicycle path. No lots would front on this road. The loop collector road is proposed as a 60' right-of-way, two-lane, 44' curb-to-curb facility. No lots would front directly on this street. Local residential streets would be 50' right-of-way, 36' curb-to-curb.

C. Grading and Drainage

Development is proposed to be located on the southerly two-thirds of the site, which is relatively flat. As a result, grading is relatively minimal with the exception of cuts into the hillside to accommodate very moderate street grades in the northernmost developed areas. Semi-artificial terraced tiers of lots are shown in an apparent effort to maximize views; the terracing is not required by topographical considerations.

Storm drainage is proposed to be carried southerly. Drainage in the eastern portion of the property would be directed to Collier Canyon Creek. The central and western portions of the site would be drained by three storm drains carrying runoff under I-580.

D. Water Service

The site currently has no public water supply. Water could be supplied directly from Zone 7 of Alameda County Flood Control and Water Conservation District, from the California Water Service Company (which supplies about 85% of Livermore), or by a private firm administered by the County, a County Service Area, or Zone 7. A 36" water main with treated water at 100 pounds pressure parallels I-580 on the south side of the freeway. The developer would need to install a water line under the freeway, a pumping station to raise water to a storage tank, and a storage tank above the project.

E. Sewage Disposal

The site currently has no public sewage disposal system. The nearest system is that of the City of Livermore. The City, while favorably disposed to annex the site, would not provide sewerage to serve urban residential development for at least 20 years, preferring that infill and contiguous areas to existing development be developed first. Thus, applicants are proposing a discrete (separate, self-contained) wastewater treatment facility to be constructed on the site capable of treating 400,000 gallons per day. The facility would provide secondary treatment plus demineralization through reverse osmosis. Treated water, having a maximum of 220 mg/l of Total Dissolved Solids (TDS), would be pumped via a transmission line to a seasonal storage reservoir and used to spray irrigate the hill (northerly) portion of the site, plus a 100 acre adjoining property. A crop management program would be developed to remove nitrates. Refer to the Sewage Disposal section of Section III and the pertinent graphics for a detailed

description of the treatment proposal.

F. Financing/Management of the Project

The project would require construction of virtually all urban infrastructure. The developer proposes to provide all major capital improvements needed to serve the project, including a new fire station, fire equipment, an elementary school, a sewage treatment plant and disposal system, a public park, street system, and water system.

A County Service Area is proposed to be created to pay for annual fire protection, sewage disposal, and street lighting costs. Other services could be assigned to the CSA if it is shown that their costs would exceed annual revenues available from the project through existing taxes and fees. County Service Areas are governed by the Board of Supervisors and are established to provide and pay for urban services not otherwise available in unincorporated areas. Existing County agencies and departments would actually provide services, but only project residents would pay the additional costs. It has been estimated that, at project buildout, each residence would have to pay about \$2,000 in annual taxes and fees, not including \$800 - \$1,200 homeowners' association fees for special services. The breakdown is as follows:

TABLE 2

ESTIMATE OF TAXES AND FEES PAID BY RESIDENTIAL HOMEOWNERS
AT PROJECT BUILDOUT

(In 1980 Dollars)

<u>Type of Tax</u>	<u>Total Project Contribution</u>	<u>Tax per Dwelling (1750)</u>
Property Tax (Total)	\$1,657,040	\$ 947
Water Fees	245,000	140
Solid Waste Collection Fees	105,000	60
Sewage Disposal Fees	614,500	351 ¹
Fire Protection Special Tax	234,500	134
Homeowners' Association - Road Median and Some Common Area Maintenance	<u>525,000</u>	<u>300²</u>
TOTAL	\$3,381,040	\$1,932

¹If demineralization of sewage is not necessary to meet water quality standards, then the annual fee would be an estimated \$167 per dwelling.

²

This represents the minimum average homeowners' association fee applicable to all dwelling units. It would cover maintenance of median strips and some common areas. The minimum figure is used in this table to

enable comparison of public costs to future residents of the project to costs for alternative project locations. The second level of homeowners' association fees would add recreation facility and pool maintenance at an additional \$800 - \$900 per unit; the third level would be required by condominium owners for common wall, roof, and grounds maintenance at an additional \$300 per unit. Property tax revenues which would be generated by the project would cover costs of all other services provided by public agencies according to a fiscal analysis submitted by a consultant. Refer to the Fiscal Impacts portion of Section III for a more detailed discussion of project costs and revenues.

A homeowners' association would be formed to maintain open space and private recreation facilities in the project. Condominium owners would also belong to a homeowners' association which would maintain common walls, roofs, building exteriors, and grounds.

III. ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

A. Regional Setting

The site is located in the north-central portion of the Livermore-Amador Valley, about three miles northwest of downtown Livermore, in unincorporated territory adjacent to the Livermore City Limits on the east and south. The Livermore-Amador Valley is a large intermontane valley separated from the Bay Plain and the Central Valley by highlands and terraces of the Diablo Range. The Valley drains westward to the Bay Plain through Niles Canyon; watercourses are all tributary to Alameda Creek.

Population in the Livermore-Amador Valley grew rapidly during the late 1950's and 1960's with a slower growth through the late 1970's due to constraints of poor air quality and sewage treatment capacity. Nonetheless, Valley population grew from 77,655 in 1970 to 104,406 in 1980, an increase of 34% (U.S. Bureau of the Census). The growth took place within the cities of Livermore and Pleasanton, which showed population increases of 28% and 92%, respectively. The other major population center in the Valley is Dublin, an unincorporated community which voted to incorporate on November 3, 1981, effective February 1, 1982. The Valley is largely residential with primarily locally serving employment; commuting outside the Valley is common. Recently, long-vacant industrial and commercial land has been developing rapidly, with concomitant increases in employment.

B. Vicinity and Site

The site is a 393 acre L-shaped area bordered by I-580 to the south, Doolan Canyon Road to the west, Collier Canyon Road to the east, and open ranchlands to the north. Immediately south of the freeway lies industrial land, a golf course, and Livermore Municipal Airport, all within the City of Livermore. The airport runway is about 2,500'

south of the southerly portion of the site. East of the site, across Collier Canyon Road, is the Valley Campus of Chabot College, also within the City of Livermore. Open agricultural ranchland lies to the west and north. The site is flanked by Cottonwood Creek to the west and Collier Creek to the east; both drain to Arroyo Las Positas, about 1,000' - 2,000' south of the site. The site slopes gradually (5% - 10%) from elevation \pm 400' at the south border to about 500' near the middle, and then much more steeply, (up to 40%) northerly to a maximum of about 800'.

Refer to the various maps at the end of this report for graphic illustrations of site and vicinity characteristics.

C. Site - Physical Environment

1. Geology, Seismicity, Soils

a. Geology

Geologic data summarized in this report has been obtained from several sources. These chiefly include reconnaissance geologic maps published by the U.S. Geological Survey (Herd, 1977; Dibblee, 1980) and the California Department of Water Resources (CDWR) (1974, 1979) and detailed site investigation reports prepared by Purcell-Rhoades and Associates (1980a, 1980b, 1981). Several other geologic studies have been reviewed and data incorporated as appropriate.

1) Setting - Stratigraphy

The proposed Northbluff project site is underlain by two distinct geologic units (Herd, 1977; Dibblee, 1980). The northerly, hilly, portions of the project area are underlain by folded, steeply dipping beds of the late Tertiary-Quaternary Green Valley and Tassajara Formations. The gently sloping southerly portions of the project site are mostly underlain by late Quaternary alluvial deposits formed by erosion of materials from the uplands to the north (Herd, 1977; Purcell-Rhoades and Associates, 1980a). Site geology is shown in Figure 15.

Field reconnaissance, trenches, test pits and borings by Purcell-Rhoades and Associates (1980a, b, 1981) indicate that the Green Valley-Tassajara Formation beds underlying the northerly portion of the Northbluff project site consist of interbedded sandy siltstone, claystone and conglomeratic siltstone. Roadcuts and occasional outcrops within the project area show that these beds strike near east-west and dip steeply south (Dibblee, 1980; Purcell-Rhoades and Associates, 1980a, 1981). These bedrock units are overlain by a sandy clay "B" soil horizon which is, in turn, overlain by silty clay topsoil (Purcell-Rhoades and

Associates, 1980a, 1981).

Test pits, trenches and borings by Purcell-Rhoades and Associates (1980a, 1981) indicate that the alluvial deposits underlying the southerly portion of the project area consist dominantly of sandy and silty clay with occasional sand layers. More granular materials underlie the southeastern portion of the site adjacent to the stream that drains Collier Canyon. Soils and bedrock beneath the Northbluff project site are regarded by Purcell-Rhoades and Associates (1980a, b) as variably expansive and resistant to erosion. Soil maps prepared by Welch and others (1966) indicate the presence of some potentially severely erodible soils within upland portions of the project site.

Structure

Folding: Field reconnaissance and mapping indicate that beds of the Green Valley and Tassajara Formations strike and dip fairly uniformly within the project area (Purcell-Rhoades and Associates, 1980a). Regional maps (Herd, 1977; Dibblee, 1980) indicate northwest trending anticlinal and synclinal folds in these beds north of the project site. It is possible that some folds occur within the Green Valley and Tassajara Formations beneath the project site but have not been identified because of poor exposures in the area.

The late Quaternary alluvial deposits are flat-lying and underformed.

Faulting: The California Department of Water Resources (CDWR) (1974) projected strands of the postulated Mocho, Parks and Livermore Faults across and near the southwestern portion of the project site (see Figure 15). Later, in 1979, the CDWR reevaluated Livermore Valley geology. They deleted the Mocho and Parks Faults from their maps and projected the Livermore Fault northwest, across the eastern portion of the project area (see Figure 15). In 1980, Dibblee postulated a northeast-southwest trending fault along the break in slope that separates the alluvial deposits from the Green Valley-Tassajara Formation bedrock.

Purcell-Rhoades and Associates excavated test pits and trenches across the possible faults reported in the above general references. A minor bedrock fault was encountered by exploratory trench T-1 in the general vicinity of the Mocho Fault as mapped by the CDWR (1974). However,

there was no evidence for displacement of the "A" or "B" soil horizons overlying the disturbed bedrock and therefore, the minor fault was judged inactive by Purcell-Rhoades and Associates (1981). No other features suggestive of faulting were observed in the 8 exploratory trenches and 20 test pits excavated by Purcell-Rhoades and Associates within the project site.

Groundwater Conditions

Groundwater was encountered at depths of 50 and 59 feet in two deep test borings made within the southern portion of the project site by Purcell-Rhoades and Associates (1980b). Shallower holes drilled in this area during earlier phases of their studies did not encounter ground water. Three deep borings were drilled in the highlands portion of the project site in order to investigate groundwater conditions in that area. Final water level measurements indicated the groundwater table to be 80 feet below ground in Boring 27, 96 feet in Boring 28 and no water was detected in Boring 29 where the hole had caved to 83 feet, 9 inches (Purcell-Rhoades and Associates, 1981). Approximate locations of the 5 groundwater observation holes are shown in Figure 17.

Purcell-Rhoades and Associates (1980b) also obtained records from Alameda County Flood Control and Water Conservation District, Zone 7, for wells near the site. Water was encountered at 37 feet in well 3S/1E/2K2 southwest of the project site and at 64 feet in well 3S/1E/1H3 located southeast of the project area. A flow rate of 12 gpm. was reported for well 3S/1E/1G2 located along the south boundary of the project site but depth to water in this well was not reported. Locations of wells near the project site are shown in Figure 2.

Purcell-Rhoades and Associates (1980b) performed 4 long-term permeability and 15 percolation tests in the northeastern, hilly, portion of the project site. The 4 long-term permeability tests were made in the Green Valley-Tassajara Formation bedrock and resulted in permeabilities in the range of 4×10^{-6} cm/sec. to 2×10^{-7} cm/sec., e.g., essentially impervious materials. Absorption rates for surface soils and shallow, weathered bedrock within the northeastern portion of the site averaged 1.89 gal/day/sq. ft., also very low.

2) Impacts, Mitigation

Preliminary development plans presented by Broadmoor Development Company for the Northbluff project envision

a mix of medium to high density residential, local commercial and school uses for the gently sloping southerly part of the project area. Single-family detached homes are planned for parts of the western portion of the project area underlain by the Green Valley and Tassajara Formations. The northern part of the project site, also underlain by the Green Valley and Tassajara Formations, is planned for sewage effluent holding ponds, areas for effluent disposal by spray irrigation, and open space.

Potential physical impacts associated with the planned development include stability of natural and graded slopes, effects of expansive soils on structures and the ability of designated portions of the project site to accommodate the proposed sewage disposal system.

(a) Slope Stability

Impact: Slope failure as a result of land-sliding or erosion could damage and endanger structures, cause loss of property values and lead to siltation in natural streams or drain ditches.

Mitigation: Geotechnical studies by Purcell-Rhoades and Associates (1980a, 1981) indicate the absence of natural landslides within the project area and low erosion potential in the soils and bedrock underlying hilly portions of site. Beds within the bedrock sequence dip steeply.

These geotechnical conditions are favorable for slope stability within the project area if conservative grading practices are followed and cut slopes are inspected by a qualified engineering geologist for unfavorable bedding or fracture plane attitudes. All permanent cut and fill slopes should be vegetated following construction and areas of potential instability regraded or buttressed.

(b) Expansive Soils

Impact: Many clay soils exhibit seasonal volume changes caused by saturation and drying. Resulting uplift pressures and/or subsidence can cause nuisances for homeowners such as sticky doors and windows or lead to structural damage and lowered property values.

Mitigation: Geotechnical studies by Purcell-Rhoades and Associates (1980a) have identified areas of expansive soils. They indicate that the problem can be mitigated by pier and grade beam or deeper than normal foundations. Compliance with site-specific soil engineering studies would be required by the Alameda County Building Code before building permits could be issued for structures within the proposed project. These studies would address expansion potential and recommend suitable foundation designs.

(c) Sewage Disposal System

Impacts: The project sponsor envisions disposal of treated sewage effluent by a combination of spray irrigation and evaporation. During periods when rainfall or humidity limits evaporation, holding ponds would provide supplemental effluent storage. Potential physical impacts associated with this plan include contamination of surface water by effluent seepage and runoff, contamination of groundwater by infiltration of effluent, erosion caused by runoff on steep slopes, disposal of salts from holding ponds and ultimate degradation of vegetation as a result of salt accumulation in soils beneath spray areas.

Mitigations: Purcell-Rhoades and Associates (1980b) have provided recommendations for the design of holding ponds and associated berms. The recommendations are in accordance with generally accepted geotechnical practices for the design and construction of low head ponds and small dams. However, it should be noted that such structures are rarely completely water-tight and some seepage may be expected. Burrowing animals and reduced maintenance in the name of economy could result in serious future problems. The individual proposed holding ponds are of small size and would probably not be subject to State of California regulations applicable to dams and reservoirs. Additional mitigating measures that could be employed include sealing of rock fractures with asphalt or grout during construction, placement of impermeable pond linings and provision of adequate funds to permit local inspection of the disposal system in the event that it is not subject to State regulation.

Available geohydrologic data indicates that the

sewage holding and disposal areas are separated from groundwater by at least 80 feet of generally impermeable strata. This separation provides substantial mitigation of the potential hazard of groundwater pollution and therefore, pollution of significant groundwater supplies by the proposed disposal system appears improbable. The geotechnical recommendations of Purcell-Rhoades and Associates (1980b) include recommendations for bentonite linings or similar treatments of ponds in situations where potentially more permeable strata are encountered during construction.

Purcell-Rhoades and Associates (1980b) provide a number of recommendations to minimize the risk of erosion and effluent runoff from spray irrigation areas. Since specific disposal areas are not presently identified, detailed application of these recommendations cannot be made. The potential for runoff and erosion increases greatly as slopes steepen and in areas where surface soils have higher sand and silt contents. In the absence of site specific studies of erosion potential, the 25% slope limitation contained in the draft guideline of the Alameda County Health Care Services Agency should be used to identify spray irrigation sites. Within the project area potentially erodible soils generally occur on slopes of 30 percent and greater (Welch and others, 1966).

b. Seismicity

1) Setting

The Northbluff project site would be strongly shaken by a major earthquake on any of the principal, active Bay Area or Livermore Valley faults.

Active regional faults include the San Andreas Fault System located about 35 miles southwest of the project site, the Hayward Fault located about 11.5 miles southwest and the Calaveras Fault, 6 miles west. Maximum magnitude earthquakes potentially expectable from these active regional faults are 8.5, 7.0 and 7.3 respectively (Wesson and others, 1975). Purcell-Rhoades and Associates (1980a) estimated that typical lateral bedrock accelerations expectable at the site from earthquakes of these magnitudes would be in the range of 0.30 to 0.34g. Purcell-Rhoades and Associates state that these bedrock accelerations should not be considered as structural design values

because of topographic effects and soil-structure interactions.

Potentially hazardous Livermore Valley faults include the Los Positas Fault located about 5 miles southeast of the site and the Greenville Fault located about 7 miles to the east (Herd, 1977; Carpenter and others, 1980).

The Greenville Fault zone was the source of two damaging earthquakes experienced on January 24 and 26, 1980 (local time). Magnitudes for these events were in the range of 5.3 to 5.9 (Cockerham and others, 1980), and varied depending on reporting stations. Peak accelerations recorded or estimated at various Livermore and San Ramon Valley locations during these earthquakes are listed in Table 3. Discontinuous minor surface faulting was experienced in an area east of the project site extending southeast from the vicinity of the Alameda-Contra Costa County line to about I-580 (Bonilla and others, 1980).

Table 3

STRONG MOTION DATA FOR VARIOUS LIVERMORE AND SAN RAMON
VALLEY LOCATIONS, JANUARY 24 AND 26, 1980 EARTHQUAKES

Station	24 Jan 80			26 Jan 80			Source
	Dist. from Epicenter (km)	Loca- tion	Peak acc. (g)	Dist. from Epicenter (km)	Loca- tion	Peak acc. (g)	
Eastman Kodak, San Ramon	16	grnd roof	0.15 0.24	21	grnd roof	0.28 0.47	(1)
Fire Station, San Ramon	19	grnd	0.04	24	grnd	0.05	(1)
Fidelity Sav., Walnut Creek	26	grnd roof	0.03 0.17	36	grnd roof	0.05 0.21	(1)
Morgan Ter. Park				9	grnd	0.27	(1)
Livermore VA Hospital	20	grnd	0.17				(2)
Del Valle Dam	23	toe crest	0.26 0.21				(2)
G.E. Corp., Vallecitos	23	grnd	0.11				(2)

Key to Sources:

- (1) CDMG (McJunkin and Ragsdale 1980)
- (2) Carpenter and others, 1980.

The Los Positas and Greenville Faults have not been adequately characterized as to probable earthquake hazard. Studies for this purpose are presently underway (Carpenter and others, 1980). Studies of a seismic source region south of the Los Positas fault are also underway (Ibid.)¹

¹ A seismic source region is an area of seismic activity that cannot be readily attributed to a specific fault or faults.

2) Impacts, Mitigation

Potential seismic hazards at the Northbluff project site include the effects on structures of strong ground shaking and ground failures during earthquakes. As discussed in the previous section, some studies have projected faults across the Northbluff project site. However, no potentially active faults have been found upon direct investigation (Purcell-Rhoades and Associates, 1980a, 1981) and therefore the hazard of surface fault rupture within the site is regarded as slight.

(a) Strong Ground Shaking

Impact: Strong ground shaking associated with the great San Francisco earthquake of 1906 and local earthquakes on January 24 and 26, 1980 has caused structural damage in the Livermore Valley.

Mitigation: Strong ground shaking is a general problem for all construction in California and some other areas of the United States as well. The Uniform Building Code is periodically upgraded based on lessons learned from major earthquakes and from research into the response of buildings to strong shaking. Use and enforcement of present Code provisions provide protection against the risk of collapse of residential or commercial structures but cannot guarantee that some damage to structures and contents will not be experienced during a major earthquake. This is a general risk assumed by all residents in California.

(b) Ground Failure

Impact: Strong ground shaking can result in ground failures such as landsliding and soil liquefaction if geotechnical factors conducive to these events are present.

Mitigation: Geotechnical studies by Purcell-Rhoades and Associates (1980a, b, 1981) indicate that conditions conducive to soil liquefaction and related phenomena are not present at the Northbluff project site. Conservative grading practices will minimize the potential for seismically induced landsliding in cut or fill slopes although minor slumping may be expected if a major earthquake occurs during the rainy season.

c. Soils

1) Setting

The Northbluff site is characterized predominantly by two soil types, DvC (Diablo clay, very deep 3-15% slopes) and LaD (Linne clay loam, 15-30% slopes). Lesser areas of LaE2 (Linne clay loam, 30-45% slopes, eroded) and DbE2 (Diablo clay, 30-45% slopes, eroded) are present as well. (Refer to Figure 16). The DvC soils underlay the vast majority of the relatively flat proposed area of construction on the site, while the three remaining soil types are located mainly in the northern highlands section of the property. (Soil Conservation Service, 1966) The highlands portion is to be used for retaining ponds and a hillside spray irrigation system.

The soils of the Linne series, LaD and LaE2, occur in large bodies on smooth, moderately steep uplands. The texture of these soils ranges from loam to silty clay. In areas that are transitional to the Diablo soils, the surface soil is slightly calcareous. LaD soil is well drained, permeability is moderately slow, runoff is medium, and the available water holding capacity is moderate. LaE2 soil often has small areas that are severely eroded; runoff is medium to rapid, and the hazard of erosion is severe. (Ibid.)

Soils of the Diablo series, DvC and DbE2, like those of the Linne series, formed in material that weathered from interbedded sedimentary rock. DvC soil is well drained, slowly permeable, characterized by medium runoff, and it absorbs water readily when dry and deeply cracked. Erosion hazards are slight to moderate, and the available water holding capacity is high. DbE2 soil is characterized by severe erosion problems and medium to rapid runoff. (Ibid.)

All four soils have good natural drainage, slow or moderately slow permeability of subsoil, and no occurrence of high water table.

The LaD and LaE2 soils have underlying materials that are unusually soft. Steeper portions of the soils may be unstable with some areas of landslips. LaD and LaE2 soils have a high resistance to piping and settlement cracking, high post-construction settlement, with severe limitations for septic tank leach lines. The Diablo association soils, DvC and DbE2, have low to moderate seepage rates and a high resistance to settlement cracking. They possess a high resistance to piping, have high

post-construction settlement and high deformability, and present severe limitations for septic tank leach lines. DvC and DbE2 soils are also subject to local landslips. (Ibid.)

2) Impacts

Construction of the Northbluff project will cover approximately two-thirds of the soil on the site from their present use to urban use. Hence, there will be a loss in soils that could typically be used for dry-farmed grain, grain hay, pasture, and especially range. This conversion of agricultural land to urban will represent a loss of around 5.6 acres of agricultural land for every 100 additional persons introduced by the proposed project. The soils are in capability groups that signify only marginal agricultural potential, excepting their very good range quality. DvC soils have severe limitations that reduce the choice of plants and cultivation is difficult. LaD soils have very severe limitations that restrict the choice of plants, being somewhat difficult to cultivate, with severe erosion hazards. LaE2 and DbE2 in the VIe-5 capability group, are soils with severe limitations that make them generally unsuited to cultivation, being difficult to cultivate. Soils in VIe-5 capability group, however, do have a high potential for forage production. Conversion to urban uses, then, would not represent a loss of prime agricultural land, but would mean a loss of very good range land. The site has supported good hay crops, sold in the vicinity.

3) Mitigation

There are no direct measures available to mitigate the loss of agricultural lands that are converted to urban uses. Approximately two-thirds of the proposed project site will be converted, while around one-third (or 131 acres) will be used for spray disposal purposes. In addition, Broadmoor has obtained an option on 100 acres of land to the west of the project site for spray disposal. These 100 acres possess natural conditions similar to the 131 acres of the project site designated for spray disposal. Lands used for spray disposal will require some kind of crop in order for the sewage system to operate properly. It is thus possible, under the guidance of an agronomist, that a suitable crop could be found to enhance the agricultural productivity of the undeveloped portion of the site. Probable crops include alfalfa, coastal bermuda grass, and reed canary grass. The success of any agricultural production will depend

upon a number of factors; including compatibility of the agricultural operation with adjacent parcels and with the proposed development.

2. Drainage/Water Quality

a. Setting

The westerly portion of the site drains to Doolan Creek; the easterly portion to Collier Canyon Creek. A portion of the site toward the center drains southerly to Arroyo Las Positas. A narrow corridor along Collier Canyon Creek at the southeast corner of the site, and along the freeway frontage, is subject to flooding. (Federal Insurance Administration) Downstream drainageways offsite are subject to flooding.

b. Impacts

The portion of the site subject to flooding is largely proposed for open space uses, which would be unaffected. However, the sewage treatment plant proposed for this corner could be affected.

The development would approximately double the present runoff from the site, contributing cumulatively to worsening of downstream flooding caused by overall development in the Livermore-Amador Valley. (Alameda County Flood Control and Water Conservation District). Existing storm drainage facilities on I-580 may not be adequate to handle the increased runoff. The site slopes steeply enough that the potential for erosion during and for one - two years following grading of each phase is high. The consequence of significant erosion on the site is sediment deposition distributed along the creeks, pipes, culverts, and channels between the site and San Francisco Bay. This could reduce the flood-carrying capacity of the systems immediately downstream, causing local flooding, and would certainly contribute to the high cost of maintenance of the entire system. This cost is borne by the general public. Erosions from the site would also increase turbidity and discoloration of downstream watercourses, degrading water quality. Downstream water quality would also be degraded by the replacement of relatively low agricultural/rangeland/pastureland and runoff pollutants with relatively high urban residential pollutants. The discrete sewage treatment system proposed has unknown risks for downstream surface and groundwater quality depending on its efficiency and dependability compared with that of a municipal plant. Land application of treated effluent also poses unknown water quality risks. The Sewage Disposal section of this report

discusses these potential problems in greater detail.

c. Mitigation

The sewage treatment facility must be designed and constructed to avoid the potential flood hazard; alternatively, it could be relocated to a flood-free area of the site.

To mitigate downstream flooding, an internal storm drain system could be required which would limit runoff to pre-existing levels. In the past, flood control programs in the Livermore-Amador Valley have taken the approach of requiring each developer to construct or pay for improvement of all major watercourses which traverse the development site to full ultimate flood-carrying capacity, considering all potential upstream development. Under this type of program, the developer would be required to improve Collier Canyon Creek on site. Developer's engineers should verify that grading and drainage will be adequate for fully developed runoff conditions to avoid potential adverse impacts upon storm drainage facilities of I-580.

To mitigate erosion/sedimentation potential, preparation and approval by Alameda County Flood Control District of a comprehensive, staged erosion and sedimentation control plan should be required as a provision of the PD District. The plan should cover both interim, temporary measures to apply during construction, as well as any permanent control measures which may be required. Mass grading should be confined to the dry season, prohibited between October 1, and April 15. Detailed closure procedures should be specified and completed prior to October 1 each year. Maintenance standards and responsibilities for all erosion control measures must be clearly spelled out. It might be desirable to retain an expert to monitor all operations during construction phases of the project to ensure the adopted mitigation measures are expeditiously carried out in the field. The consultant would be paid for by the developer and serve to augment the County inspection staff in number and expertise.

Water quality degradation is largely inevitable when ranchland is converted to urban uses. Impacts can be lessened by regular cleaning of streets and parking areas using advanced broom and vacuum street sweepers; this measure would remove 67% of biological oxygen demand, 85% of phosphates, and 83-98% of heavy metals. A procedure for settling or filtering contaminants could be designed into the runoff system plan. These and other measures effective to mitigate water quality impacts are expensive and it could be considered inequitable to require project residents to pay for them because they would contribute only incrementally to the overall problem.

3. Vegetation/Wildlife

a. Setting

The site is virtually all grassland, consisting of long-established but non-native annual grasses. A cluster of introduced trees, including eucalyptus, pepper tree, and locusts, is located north of the Airway Boulevard/I-580 interchange. A north-south line of eucalyptus trees bisects the southerly part of the site.

Wildlife found on site is limited to those species which can tolerate agricultural use, scattered residences, and freeway proximity. Representative species include barn owl, sparrow hawk, Brewer's Blackbird, gopher, gopher snake, cabbage butterfly. No rare or endangered species would be expected to be found on the site.

b. Impacts

The project would transform the lower half of the site from grassland/agricultural to suburban/exotic vegetation. The upper half of the site would be used for agricultural purposes, irrigated by treated sewage effluent from the project.

The wildlife would be limited to species which can co-exist in such an environment. Project plans show no provision for saving existing trees. Overall impacts on vegetation and wildlife are not considered significant because of the site's low existing habitat values.

c. Mitigation

The grove of trees north of Airway Boulevard should be saved if feasible and used to enhance the park proposed at that location.

4. Air Quality

This section is based on an air resources analysis prepared by Phillips Brandt Reddick. (See References.)

a. Setting

This section will discuss air resources in the Livermore-Amador Valley in relation to regional air quality planning, federal and state air quality standards, topography/meteorology, identified air quality problems and regional and local air quality trends (historical and projected). The Livermore-Amador Valley (in Alameda County) is within the San Francisco Bay Regional Air Basin/air quality planning area. The basin includes all or parts of nine Bay Area counties: Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara, Marin, Napa, Sonoma

(southern), and Solano (southwestern). The air quality of the basin is determined by the primary pollutants added daily, and by the secondary pollutants already present in the air mass. The San Francisco Bay Area is designated under the Clean Air Act as a region where three national ambient air quality standards are being exceeded.

Primary pollutants are emitted directly from stationary or mobile sources and include carbon monoxide (CO), nitric oxide and nitrogen dioxide (NO and NO₂), sulfur dioxide (SO₂) particulates and various hydrocarbons (HC). Secondary pollutants are created with the passage of time, in the air mass, and include ozone (O₃), photochemical aerosols and peroxyacetyl-nitrate (PAN). Oxidants represent the major air quality problem basin-wide. Air quality at the site is a function of the primary pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors which influence the intrusion of pollutants into the area from sources outside the immediate vicinity and the extent to which pollutants are trapped within the area.

Topography/Meteorology

Topography and meteorology interact to produce conditions which may either trap pollutants or disperse them. This section describes how topography and meteorology interact in the Bay Area and in the Livermore-Amador Valley to affect local air quality conditions.

Bay Area topography is characterized by numerous ridges, hills, valleys, the Pacific Ocean, a central bay, and major inland flat land areas. The Livermore-Amador Valley (an 81 square mile basin) is a sheltered inland valley with an elevation of about 400 feet above sea level. Mountains, which are 1,000 feet or more above sea level, almost completely surround the Valley. Four narrow passes lead through these mountains into the Valley, with Dublin Canyon at the northwest edge of the Valley forming the major wind corridor from areas to the west.

Warm, dry summers and mild, moist winters characterize the climate of the Valley. Surface winds (primarily from the west, northwest, southwest, and northeast) are channeled into the Valley, carrying pollutants from the heavily populated areas from which they originate. Prevailing winds from these areas occur over 50 percent of the time. The mountain barrier and lower wind speeds in the Valley inhibit the dispersion of pollutants transported to, or generated in, the local area. Primarily between April and October, temperature inversions trap air pollutants near the surface, particularly hydrocarbons and nitrogen oxides, resulting in severe photochemical

oxidant or "smog" concentrations. Particularly in late summer and early fall the region experiences "light variable" winds 23-34 percent of the time (see Figure 19). These conditions lead to a stable inversion which, with warm temperatures, is largely responsible for the concentration of heavily polluted air in the Valley. Although these light variable winds do not bring in additional contaminants from outside the Valley, they are not forceful enough to allow mixing or dispersion of pollutants already in the area.

In general, motor vehicles generate approximately 64 percent of the total reactive hydrocarbons, 61 percent of the total nitrogen oxides, and 93 percent of the total carbon monoxide emissions. (U.S. Environmental Protection Agency and Livermore-Amador Valley Water Management Agency, 1975). These percentages are most likely larger in the Livermore-Amador Valley, where few industrial (stationary) sources exist.

Air pollution, regionally and in the Valley, is primarily the result of high photochemical oxidant concentrations which are formed by reactive hydrocarbons and nitrogen oxides in the presence of sunlight. Reactive hydrocarbons are considered to be the limiting factor in the formation of oxidants. Particulate concentrations in the Valley also reach high levels; however, this is primarily due to blowing dust.

The Valley, which is located downwind of the major metropolitan centers of the Bay Area, receives pollutants generated to the west which are transported into the Valley by the prevailing sea breezes. Transport of pollutants into the Livermore-Amador Valley is therefore a significant issue in air quality planning efforts for the Bay Area. Reductions in regional air emissions can improve local air quality in the Valley, as well as the Bay Area as a whole.

Air Quality Trends

Air quality is determined by monitoring pollutant levels at Bay Area Air Quality Management District (BAAQMD) operated stations located throughout the Bay Area. The five pollutants of significance to the region are sulfur dioxide (SO_2), total suspended particulates (TSP), carbon monoxide (CO), nitrogen dioxide (NO_2) and photochemical oxidants, specifically ozone (O_3). Table 3 presents the federal and state air quality standards for these and other pollutants.

Data from the monitoring stations indicate regional trends in air quality. Data from the monitoring station located in Livermore is the most representative of air quality in the

TABLE 4

AIR QUALITY STANDARDS AND EMERGENCY CRITERIA

Air Pollutant and Action Required	Air Quality Standards ^{a)}			Emergency Criteria						
	California	National ^{b)}		California Episode			National Episode			
		Primary	Secondary	Stage 1 Health Advisory	Stage 2 Warning	Stage 3 Emergency	Alert Level	Warning Level	Emergency Action Level	Significant Harm To Health Level
Ozone O ₃	0.10 ppm, 1-hr. avg.	0.12 ppm (240 $\mu\text{g}/\text{m}^3$) 1-hr. avg.	0.12 ppm (240 $\mu\text{g}/\text{m}^3$) 1-hr. avg.	0.20 ppm, 1-hr. avg.	0.35 ppm, 1-hr. avg.	0.50 ppm, 1-hr. avg.	0.10 ppm ^{***} 1-hr. avg.	0.40 ppm, 1-hr. avg.	0.50 ppm, 1-hr. avg.	0.80 ppm, 1-hr. avg.
Carbon Monoxide CO	10 ppm, 12-hr. avg.	9 ppm, (18 mg/m^3) 8-hr. avg.	9 ppm, (18 mg/m^3) 8-hr. avg.	20 ppm, 12-hr. avg.	35 ppm, 12-hr. avg.	50 ppm, 12-hr. avg.				50 ppm, 8-hr. avg.
	40 ppm, 1-hr. avg.	35 ppm, (40 mg/m^3) 1-hr. avg.	35 ppm, (40 mg/m^3) 1-hr. avg.	40 ppm, 1-hr. avg.	75 ppm, 1-hr. avg.	100 ppm, 1-hr. avg.	15 ppm, 8-hr. avg.	30 ppm, 8-hr. avg.	40 ppm, 8-hr. avg.	75 ppm, 4-hr. avg. 125 ppm, 1-hr. avg.
Nitrogen Dioxide NO ₂	0.25 ppm, 1-hr. avg.	0.05 ppm (100 $\mu\text{g}/\text{m}^3$) AAQ	0.05 ppm, (100 $\mu\text{g}/\text{m}^3$) AAQ	..			0.15 ppm, 24-hr. avg.	0.30 ppm, 24-hr. avg.	0.40 ppm, 24-hr. avg.	0.50 ppm, 24-hr. avg.
Sulfur Dioxide SO ₂	0.05 ppm,* 24-hr. avg.	0.14 ppm, (365 $\mu\text{g}/\text{m}^3$) 24-hr. avg.		0.20 ppm, 24-hr. avg.	0.70 ppm, 24-hr. avg.	0.90 ppm, 24-hr. avg.				
	0.50 ppm, 1-hr. avg.	0.03 ppm, (60 $\mu\text{g}/\text{m}^3$) AAQ	0.50 ppm, (1300 $\mu\text{g}/\text{m}^3$) 3-hr. avg.	0.50 ppm, 1-hr. avg.	1.0 ppm, 1-hr. avg.	2.0 ppm, 1-hr. avg.	0.30 ppm, 24-hr. avg.	0.60 ppm, 24-hr. avg.	0.80 ppm, 24-hr. avg.	1.0 ppm, 24-hr. avg.
Ozone in Combination With Sulfur Dioxide ^{d)}				0.20 ppm, 1-hr. avg.	0.35 ppm, 1-hr. avg.	0.50 ppm, 1-hr. avg.				
Sulfate in Particulate Matter	25 $\mu\text{g}/\text{m}^3$, 24-hr. avg.			25 $\mu\text{g}/\text{m}^3$, 24-hr. avg. combined with Ozone, 0.20 ppm, 1-hr. avg.						
Particulate Matter (TSP)	100 $\mu\text{g}/\text{m}^3$, 24-hr. avg. 80 $\mu\text{g}/\text{m}^3$ AGM	260 $\mu\text{g}/\text{m}^3$, 24-hr. avg. 75 $\mu\text{g}/\text{m}^3$ AGM	150 $\mu\text{g}/\text{m}^3$, 24-hr. avg. 80 $\mu\text{g}/\text{m}^3$ AGM				375 $\mu\text{g}/\text{m}^3$, 24-hr. avg.	625 $\mu\text{g}/\text{m}^3$, 24-hr. avg.	875 $\mu\text{g}/\text{m}^3$, 24-hr. avg.	1000 $\mu\text{g}/\text{m}^3$, 24-hr. avg.
Particulate Matter ($\mu\text{g}/\text{m}^3$) x SO ₂ (ppm) x 2620							85,000 24-hr. avg.	261,000 24-hr. avg.	393,000 24-hr. avg.	490,000 24-hr. avg.

* Occurring in combination with a violation of the State Ozone or TSP standards.

** No standard or criteria when blocks are blank.

*** This is inconsistent with the federal standard of 0.12 ppm, hourly average, and is expected to be revised in the near future.

(Continued)

TABLE 4 (Continued)

AIR QUALITY STANDARDS AND EMERGENCY CRITERIA

Air Pollutant and Action Required	Air Quality Standards ^{a)}			Emergency Criteria						
	California	National ^{b)}		California Episode			National Episode			
		Primary	Secondary	Stage 1 Health Advisory	Stage 2 Warning	Stage 3 Emergency	Alert Level	Warning Level	Emergency Action Level	Significant Harm To Health Level
Lead Pb	1.5 ug/m ³ 30-day avg.	1.5 ug/m ³ calendar quarter average								
Hydrocarbons (corrected for methane)		0.24 ppm (180 ug/m ³) 3-hr. avg. 8-8 a.m.	0.24 ppm (180 ug/m ³) 3-hr. avg. 8-8 a.m.							
Hydrogen Sulfide H ₂ S	0.03 ppm, 1-hr. avg.									
Vinyl Chloride (chloroethene)	0.01 ppm 24-hr. avg.									
Ethylene	0.10 ppm 8-hr. avg. 0.50 ppm 1-hr. avg.									
Visibility Reducing Particles	In sufficient concentration to reduce visibility to less than ten miles at relative humidity of less than 70%.									
Actions to be Taken				Voluntary reduction in physical activity and vehicle operation. Open burning banned (not an action at this level after 1978).	Action ranges from voluntary to mandatory.	Mandatory abatement measures. State can take action if local efforts fail.	Open burning prohibited. Requested reduction in vehicle operation. Industrial curtailment.	Incinerator use prohibited. Required reduction in vehicle operation. Industry curtailed further.	Vehicle use prohibited. Industry shut down or curtailment. Public activities cease.	Same as "Emergency" except most industry shut down.

a) Standards shown in parenthesis are restatements of the preceding standard but expressed on an alternative basis.

b) Concentrations other than annual averages not to be exceeded more than once a year.

d) Ozone and sulfur dioxide concentrations both must be greater than 0.10 ppm.

Livermore-Amador Valley. The following discussion summarizes regional and local air quality trends indicated by the data and the 1979 Bay Area Air Quality Plan.

Sulfur Dioxide (SO₂)

SO₂ standards are rarely exceeded at monitoring stations in the Bay Area. The current state 24-hour sulfur dioxide standard was violated once in 1975. Sulfur dioxide emissions are projected to increase substantially in 1985 and 2000, due primarily to the expected transition from natural gas to fuel oil and coal in electric utility and industrial boilers. The increased emissions are not projected to result in violations of the federal standards. Due to the recent revision of state SO₂ standard, it is not known if the standard will be violated in the future.

In 1975 and 1979, the annual average SO₂ concentration measured at the Livermore station was approximately 0.8 parts per billion (ppb) or 2.7 percent of the federal standard.

Total Suspended Particulates (TSP)

TSP concentrations generally show a pattern of low values near the coast increasing with distance inland into the dry sheltered valleys. Background TSP levels range from 30 micrograms per cubic meter (ug/m³) at the coast to 60 ug/m³ at most inland valley sites. Both federal and state standards for TSP are violated in the region by a small margin.

Emissions of particulate matter are projected to increase steadily through the year 2000. The significance of the increased emissions with respect to future violations cannot be assessed with existing data. (Association of Bay Area Governments, 1979).

The state and federal TSP standard has been exceeded and is, therefore, a concern in the Livermore-Amador Valley. The Livermore station has recorded violations of the 24-hour and annual state TSP standard and the annual federal TSP standard. State standard was exceeded 9 times in 1980. The annual geometric mean of TSP at the Livermore station was 70 ug/m³ in 1975 and 1979, and 61 ug/m³ in 1980. Particulates are a relatively localized pollutant and high recorded levels have been associated with nearby construction activities.

Carbon Monoxide (CO)

Federal and state one hour CO standards have not been exceeded in the Bay Area in the present decade. However, the federal

8-hour average standard of 9 parts per million (ppm) has been frequently exceeded in some areas of the region. The number of days with 8-hour CO violations has decreased from 69 days in 1976 to 21 days in 1979 to 18 days in 1980. Total regional CO emissions are projected to decline steadily from now to 2000 despite the projected increase in vehicle miles traveled. However, this decline is not expected to be sufficient to meet CO standards. CO problems are localized and require area by area analysis to determine specific causes.

The federal 8-hour CO standard has not been exceeded at the Livermore station. However, if vehicle miles of travel increase in the Valley, as is expected through the year 2000, problems from higher CO concentrations may occur.

Nitrogen Dioxide (NO₂)

The federal annual average NO₂ standard (0.05 ppm) has never been exceeded in the region and it is projected that it will not be violated in the future. The state NO₂ standard is usually violated several times a year, especially in the South Bay Area. However, in 1979 no violations of the state NO₂ Standard (0.25 ppm-1 hour) were recorded in the region. Nitrogen dioxide is an important factor in the photochemical oxidant formation cycle and it is also a major factor in brownish discoloration of the air.

The emission inventory projection for NO_x does not indicate a significant increase in NO_x emissions. Analysis of oxidant control measures shows that additional controls of NO_x emissions beyond those currently planned for will worsen oxidant air quality in the Bay Area. (Bay Area Air Quality Management District, April 1980). The implications to be drawn are that hydrocarbons should be stringently controlled and that care should be exercised in deciding how much control of oxides of nitrogen emissions is appropriate.

The annual average NO₂ concentration at the Livermore Station in 1975 and 1979 was 3.0 and 3.1 parts per hundred million (pphm), respectively. These readings are well below the state NO₂ standard.

Photochemical Oxidants/Ozone (O₃)

The BAAQMD states that based on 1977 to 1979 data, 56 percent of the Bay Area population live in areas which meet the federal ozone standard. Non-attainment areas are primarily the Santa Clara, Diablo and Livermore-Amador Valleys. (*Ibid.*) A trend study (See Table 4), based on seasonal high-hour ozone averages shows a decrease in ozone concentration over 18 years (1962-1979).

The closely comparable decrease in hydrocarbon/oxides of nitrogen ratios from emissions inventories serve to support current hydrocarbon directed control strategies. (Ibid.) Local differences in the rate of improvement suggest that increased motor vehicle travel continues to counterbalance increased control in some parts of the region.

The Livermore-Amador Valley suffers from some of the poorest air quality in the San Francisco Region. As shown in Table 5, the number of days on which the federal one-hour ozone standard is violated has decreased over the years.

Air pollutants introduced from the Bay Area to the west are trapped by the eastern ridges and add to the locally generated emissions. Similarly, air contaminants produced within the Valley tend to remain and be concentrated there. The low inversion heights and prevailing wind patterns are such that during the "smog season" (April through October), the Valley generally lies under a blanket of stagnant, contaminated air.

Areas to the west, which produce more pollutants than are generated in the Valley, generally have better air quality because of the cleansing effects of western winds. It has been estimated that the transport of air pollutants generated in other areas of the region accounted for approximately 50 percent of the oxidants detected in the Valley in 1966-1967, and in 1975, accounted for approximately one-third of the Valley oxidant problem. Locally emitted hydrocarbons and nitrogen oxides are increasingly becoming the major source of the oxidant concentration in the Valley.

Emission inventory projections are projecting hydrocarbon emissions to decline moderately by 1985, and to rise back to the 1975 level by the year 2000. As noted above, oxides of nitrogen are projected to remain relatively constant from 1975 to 2000. These projections suggest that oxidant levels will be moderately reduced (by approximately 10 to 20 percent) by 1985, but this improvement will not be maintained through the year 2000. Air quality data collected over the past several years indicates a slow trend toward lower oxidant levels, and it is expected that this trend will continue for a few more years. Around 1985, the trend will reverse if no further controls are implemented. Air quality degradation in the Livermore-Amador Valley will, therefore, continue to be impacted from locally generated emissions and from regionally generated emissions which are thereafter transported to the Valley.

Regional Air Quality Planning

The Association of Bay Area Governments (ABAG) and the Bay Area Air Quality Management District (BAAQMD) prepared an air

TABLE 5

Average High-Hour Ozone Concentrations for Days with Comparable Temperature and Inversion Conditions. (April through October "Smog" Seasons, 1962-1979)

Monitoring Station	Average High-Hour Ozone Concentration (parts per billion)																	
	'62	'63	'64	'65	'66	'67	'68	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79
San Francisco	110	96	122	70	64	62	36	33	55	39	26	29	42	22	39	22	38	33
San Leandro	104	127	153	154	114	98	86	99	98	85	78	89	81	93	70	48	68	59
San Jose	90	137	109	125	86	101	102	102	98	62	77	91	129	113	90	77	104	98
Redwood City	104	81	80	108	80	74	66	73	66	58	65	54	59	64	53	43	43	45
Diablo Valley	82	87	80	88	80	106	80	102	70	72	69	67	64	79	60	65	86	72
San Rafael	64	69	56	64	59	56	50	56	66	53	44	39	46	44	41	44	59	61
6-Station Average	92	100	100	102	80	83	70	78	76	62	60	62	70	69	59	50	66	61
Livermore						106	142	144	104	88	69	96	103	80	84	69	77	76
7-Station Average						86	80	87	80	65	61	66	75	71	62	53	68	63

Source: Bay Area Air Quality Management District, 1980

TABLE 6
OZONE CONCENTRATIONS
LIVERMORE
(1962-1979)

Year	No. of Days High Hour >.12 ppm	Average High-Hour Concentration (ppm)
1967	21	0.106
1968	44	0.142
1969	53	0.144
1970	23	0.104
1971	13	0.088
1972	4	0.069
1973	17	0.096
1974	21	0.103
1975	8	0.080
1976	8	0.084
1977	3	0.069
1978	2	0.077
1979	3	0.076
Average for 13 years:	17	0.095

Source: Bay Area Air Quality Management District, 1980.

quality maintenance plan (AQMP) in June 1978. It was designed to reduce hydrocarbon emissions, and provide for attainment and maintenance of the federal oxidant standard by 1985-1987. The 1979 Bay Area Air Quality Plan (AQP) is an update of the AQMP which provides oxidant control strategies and addresses particulate problems in the region. The AQP was adopted by the ABAG General Assembly in January 1979 and sent to the California Air Resources Board, which in turn submitted the Plan to the Environmental Protection Agency (EPA) as part of the California State Implementation Plan. Currently, the major item preventing approval of the AQP is the lack of legal authority from the California State Legislature to implement a vehicle inspection and maintenance program. The BAAQMD is currently preparing a new plan, to be submitted to the EPA in July 1982, which outlines compliance with oxidant and carbon monoxide standards by 1987.

b. Impacts

Approval of the proposed project will result in impacts to air quality from stationary sources and mobile sources. Stationary sources include emissions onsite from construction activities, emissions from space and water-heating devices, and emissions at the power plant associated with the generation of electricity for the project. Mobile source considerations include short-term construction activities and long-term traffic generation.

Short-Term Impacts

The preparation of the study area for building construction will produce two types of air contaminants: exhaust emissions from construction equipment and dust generated as a result of soil movement. The emissions produced during grading and construction activities, although of short-term duration, could be troublesome to workers and adjacent developments, even though prescribed wetting procedures are followed. These emissions will not, however, cause ambient air quality standards to be exceeded onsite.

Exhaust Emissions from Construction Equipment

It is anticipated that the stationary and mobile source impacts from construction equipment will be minor. They will be short-term in nature, occurring only during the construction period and not regionally significant. On a local level, exhaust fumes and dust may adversely impact construction workers.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust emissions

that may have a substantial temporary impact on local air quality. Building and road construction are the prevalent construction categories with the highest emission potential. Emissions are associated with land clearing, blasting, ground excavation, cut and fill operations, and construction of the units.

Dust emissions vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing weather. A large portion of the emissions result from equipment traffic over temporary roads at the site. The quantity of fugitive dust generated is proportional to the area of land being worked and the level of construction activity. Emissions from heavy construction operations are directly proportional to the silt content of the soil (that is, particles smaller than 75 micrometers in diameter) and inversely proportional to the square of the soil moisture. Based upon field measurements of suspended dust emissions from apartment and shopping center construction projects, an approximate emission factor for construction operations is: 1.2 tons of fugitive dust per acre of construction per month of activity. (U.S. EPA, August 1977).

Long-Term Impacts

Long-term impacts are those associated with permanent usage of the facilities and dwelling units proposed. The air pollutants generated can be projected as the sum of both stationary and mobile source emissions. Daily emissions can be determined through the multiplication of a usage rate and an emission factor for each primary pollutant (Appendix A). Emission factors for the year 1987 are used since project build-out is estimated to be around this time. The results obtained are provided in Table 6 and are summarized below.

In general, stationary source emissions generated by the proposed residential and commercial land uses, and sewage facilities represent approximately 10 percent of the total emissions from all sources. In 1987, motor vehicle emissions will account for 90 percent of the total emissions from the proposed project, although exhaust control technology or legislation may change this percentage.

To assess what this atmospheric loading implies in terms of its relative impact upon air quality, the project-generated emissions may be compared with regional projections. Projected daily emissions are available for 1979 and 1987 only. Table 7 tabulates the daily emission burden for the region and the proposed project for 1987. The emissions from the project would represent 0.05% of the regional emissions in 1987.

Table 7
PROJECTED MOBILE AND STATIONARY SOURCE EMISSIONS
RESIDENTIAL, COMMERCIAL, SCHOOL AND SEWAGE TREATMENT PLANT USES

Primary Pollutant	Natural Gas Combustion Emissions (including space heating)(1) (Tons/Day)	Generation of Electricity Fuel Oil Comb. Emissions(2) (Tons/Day)	1987 Vehicular Emissions(3) (Tons/Day)	Total Emissions From all Sources (Tons/Day)
CO	0.0045	0.0064	1.3764	1.3873
HC	0.0018	0.0057	0.1369	0.1444
NO _x	0.0227	0.0733	0.3023	0.3983
SO _x	0.0001	0.0844	0.0498	0.1343
Particulates	0.0023	0.0128	0.0605	0.0756

(1) Based upon consumption rates as shown in the Appendix A.

(2) Based upon consumption rates as shown in the Appendix and 10,387 BTU's required to produce 1 kwh.
Assume fuel oil is used to generate all electricity required by the project.

(3) Based upon vehicle miles traveled as shown in the Appendix.

Table 8

REGIONAL EMISSIONS INVENTORY COMPARISON, 1987 (TONS/DAY)

<u>Pollutant</u>	<u>San Francisco Bay Area¹</u>	<u>Proposed Project</u>
CO	2,220	1.39
HC	540	0.14
NO _x	648	0.40
SO _x	187	0.13
Particulates	536	0.08
TOTAL	4,131	2.14

¹ San Francisco Bay Area Quality Planning Programs, A Q
Tech Memo 36, May 1981.

Air Quality Projections

Assessing the impact of the proposed project on the local air quality is achieved herein by using the Caltrans Caline 3 and Gaussian Plume air quality models. Caline 3 allows carbon monoxide (CO) concentrations to be estimated along each roadway corridor. Because of the relative inertness of carbon monoxide in the photochemical smog formation process and limitations on knowledge of dispersion characteristics of the other air pollutant species, carbon monoxide is the most suitable tracer pollutant for micro-scale modeling. The Gaussian Plume model was used to estimate the HC and NO_x concentrations along the roadway corridors. This model is more appropriate for the highly reactive gases, HC and NO_x. Secondary pollutants such as particulates are a large-scale phenomenon, and should be analyzed on a regional basis, rather than a local one.

Assumptions made for Caline 3 and Gaussian Plume appear in Appendix A. Results of the calculations are given in Table 9, and Table 10. The concentrations within the tables illustrate the maximum increase in the concentration of carbon monoxide, hydrocarbons and nitrogen oxides adjacent to the most heavily traveled intersections onsite; the carbon monoxide concentrations also include the second highest maximum 8-hour CO level in 1980, measured at the Livermore-Railroad (6.1 ppm). (California Air Resources Board, 1980.) The one-hour state and federal CO standard is rarely, if ever, exceeded.

Table 9

MAXIMUM EIGHT-HOUR CARBON MONOXIDE CONCENTRATIONS¹

Intersections ² and Roadways	Total Concentrations ³		
	15 m.	30 m.	61 m.
Intersection A	6.41	6.26	6.21
Intersection B	6.45	6.26	6.21
Intersection C	6.48	6.34	6.3
Intersection D	6.33	6.23	6.2
I-580	6.94	6.79	6.6

¹ Concentrations are in parts per million (ppm).

² Intersection A - New Collier Canyon Road at Doolan Road (loop)
Intersection B - New Collier Canyon Road at Westward Ramps
Intersection C - New Collier Canyon Road at Eastward Ramp
Intersection D - Doolan Road at New Collier Canyon Road (loop)

³ Concentration of CO at downwind corner of intersection or downwind side, at receptor distance of 15 meters, 30 meters, 61 meters from the centerline of the road. Concentrations measured include the second highest 8-hour mean CO level measured at Livermore-Railroad in 1980 (6.1 ppm) plus CO concentrations contributed from traffic on respective roadways.

Table 10

HYDROCARBON AND NITROGEN
DIOXIDE CONCENTRATIONS¹

Roadways	Total Concentrations ²		
	0	(HC/NO _x) 100 ^x	200
Interstate 580	1.06/1.67	.62/.99	.53/.84
New Collier Canyon Road	.22/.20	.12/.11	.11/.09
Doolan Road	.22/.11	.13/.07	.11/.06
Eastward Offramp	.44/.22	.26/.13	.22/.01
Westward Offramp	.22/.21	.13/.07	.11/.06

¹ Concentrations are in parts per million (ppm) in the peak hour and calculated by means of Gaussian Plume Model.

² Concentrations are normal distances (in feet) from the downwind edge of the road shoulder. The NO_x concentrations include the 2nd highest NO_x measured County-wide (Alameda) for a one-hour period (.20 ppm) plus NO_x contributed from traffic on respective roadways. Ambient air quality data not available for hydrocarbon. HC concentrations are reflective of HC concentrations from traffic on roadways only.

Therefore, the CO concentrations shown in Table 8 are computed for the peak 8-hour average and compared to the federal 8-hour standard of 9.0 ppm.

The carbon monoxide levels shown in Table 8 do not exceed the federal air quality standard (9.0 ppm for 8-hour averaging). Nitrogen oxide levels exceed the state standard (.25 ppm for one-hour averaging) and the federal standard (.60 ppm for one-hour averaging) along the freeway only. The hydrocarbon standard, a three-hour averaging period, is not readily compared to the one-hour averaging data. However, the one-hour computed levels are near or below the three hour standard at distances from the freeway of 100 feet or more. The project would contribute to adverse regional air quality and make attainment of air quality standards more difficult.

Air Quality Management Plan

The proposed project is consistent on an individual basis with the AQMP as it is consistent with the population forecasts upon which the AQMP emission projections are based. The project will generate approximately 181,710 daily vehicle miles of travel. Although the provision of community commercial facilities will aid in reducing project-generated vehicle miles of travel, relatively large additional miles will be generated because of the project's distance from schools, employment and major shopping areas. Additionally, vehicles' miles of travel are not directly proportional to air pollutant emissions. Other factors including cold starts, speed of travel, congestions, and vehicle age and maintenance strongly influence emissions rates.

c. Mitigation

Any development of the magnitude proposed will be detrimental to air quality in a non-attainment area such as the Livermore-Amador Valley. Some mitigation measures are available to lessen the impact, but the impact would remain. Project proponents advance the argument that by the time the project is built out, a shortage of housing will exist in the Valley because of rapid employment growth. Thus, provision of housing in the project would reduce vehicle miles traveled to work over alternative locations for housing such as Tracy, Brentwood, and Antioch. This analysis assumes that controlled growth strategies of Pleasanton and Livermore remain in effect throughout the decade. Also assumed is that new housing in the Valley will be occupied primarily by persons working within the Valley, and that the project would serve the Valley's new employees appropriately. All of these assumptions are open to debate. It must be noted that journey-to-work VMT is only a fraction of total household VMT; the

project's location ensures that, even if the assumption about reduced journey-to-work VMT is correct, the reduction may be more than counterbalanced by increased VMT for all other trips when compared with projects within existing cities. To argue that provision of housing will balance employment to reduce VMT would require analysis of type of future employment vs. price of new housing to demonstrate that new employees could afford new Valley housing. The most pressing need in the Valley at this time is for greater housing opportunities for renters and lower income households.

Some measures which may reduce VMT are proposed as part of the project: bicycle paths connecting major residential areas with commercial and recreation facilities, and incorporation of a bus stop into the design of the new freeway interchange. A park-and-ride facility may be feasible near or within the new interchange to enable project residents to drive to the bus stop or carpool rendezvous.

Construction dust problems can be mitigated by frequent sprinkling of unpaved surfaces, by reducing earthmoving activities during periods of high winds, and by minimizing the amount of earth to be moved and raw surfaces exposed at any one time. Significant mitigation of air quality impacts relies on exhaust emission controls and other macrolevel actions beyond the scope of this one particular project.

5. Energy

a. Setting

Energy consumption on the site is relatively low and can be attributed to its current land use, a mixture of grazing and agriculture (dry farmed grain for feed). Energy is generated from production of feed and beef, which compensates for that consumed by the land use.

b. Impacts

Northbluff development would greatly increase energy consumption over present levels. Implementation of the project would require energy in each development stage; site grading and preparation as well as construction and operation of the streets, utilities, residences, commercial center, school, sewage treatment facility, and recreation area. In addition, substantial amounts of energy would be used in transportation of residents.

Table 11 shows the calculation of energy inputs for the project over a period of twenty years. While the project lifetime would be much longer, present assumptions regarding energy use may not hold further into the future. A twenty year period emphasizes the need to look at the long-term energy commitments without undue risk of obsolete figures. Residential energy inputs were calculated for each of the four housing types: detached single-family, clustered single-family, clustered town homes, and walk-up apartments, to yield a more accurate estimate than if a single figure were used for all. Unless otherwise noted, all energy consumption figures in this section are in therms (1 therm=100,000 BTU=29.3 KWH, 58 therms= 1 barrel of crude oil.)

The project's total energy input for twenty years, including both direct and indirect inputs, is calculated to be approximately 214,100,955 therms. Actual consumption may be somewhat higher since no data is available for site preparation, construction, and operation of the recreational area. The three largest factors, accounting for 90% of the total energy use are (in decreasing order): transportation, residential operation, and residential construction.

The estimated total of 214,100,955 therms equals approximately 122,340 therms per unit. Columbia (PD-38) development of 530 detached homes in the hill area of Castro Valley, will use approximately 88,618 therms per unit; Jensen Ranch (PD-21), a 1220 unit project in Castro Valley with both detached and attached units, approximately 87,410 per unit; a 358-unit detached home project in Dublin, approximately 106,499 per unit. Jensen Ranch development has the lowest energy input figure, because it incorporates conservation measures in its residences to reduce consumption by 30% and additional savings stem from 45% of the residences being clustered townhouses. As illustrated in Northbluff, energy input values, clustered townhouses and apartments use less energy than detached residences because of their smaller size and shared common walls. While 65% of Northbluff residences are clustered townhomes and apartments the energy savings are offset by construction and operation of its sewage treatment facility, commercial area and school. Perhaps the single largest factor is its location, which necessitates building new infrastructure and increased energy consumption in transportation.

The project would require larger amounts of energy relative to projects located closer to urban areas and/or of higher density. A hypothetical project of similar design and size located in Oakland hills would use only 77,460 therms/unit, because of reduction in daily vehicle miles traveled (40 as opposed to 104), and existence of established community infrastructure. A high rise project in a flat area of

Oakland with the same number of units would use 64,709 therms/unit. The project would foster dependence upon the automobile, as it is not located near transportation lines, schools, employment center, or large shopping areas. The transportation component of Northbluff accounts for 52% of the total energy requirement, as opposed to 32-38% in the hypothetical Oakland developments.

c. Mitigation

The large scale of the project and the existence of a single developer lends itself to application of alternative energy production and energy conservation that is not feasible for smaller projects. Solar and wind energy can be used as supplemental energy sources to substantially reduce pollution and dependence on fossil fuels.

A relatively high percentage of sunny hours in the Livermore-Amador Valley, as well as the site's southern orientation, make the project well suited for application of solar energy. Presently, solar energy is best suited for space and water heating. Solar heating systems can be either passive or active. In active systems, separate equipment is used for the solar collector and the storage medium, necessitating the use of pumps. Passive systems use the collector as the storage medium, so that no intermediate storage and pumping step is used.

Heating of domestic water is a practical solar energy application. Two types of active systems are commonly used for water heating. In the first, water is pumped through the collector and then into a preheat tank, which directly supplies a conventional water heater. The other system uses a single tank with separate fluid systems. Solar heated water (containing anti-freeze) is circulated through a heat exchanger, which heats the domestic water. In good weather, solar water heaters are capable of producing boiling water. In the case of a series of inclement days, when water is insufficiently heated by the sun, an auxiliary conventional heater can be used.

Space heating is another effective application of solar energy. Both active and passive solar energy systems can be used. A conventional home can be retrofitted with an active solar system which uses either heated air or fluid passed through a heat exchanger to warm the house. Residences can also be designed for passive solar use. Usually a large window with southern exposure lets in light energy which is stored as heat in either tiled flooring or liquid filled containers/tubes, which radiate heat once the room temperature drops. With solar space heating systems, conventional or wood burning

TABLE 11
ENERGY INPUTS, NORTHBLUFF

Energy Inputs	Therms/Unit				Subtotal Therms				Total
	SFD	SFC1	Twnc1	WUA	151 SFD	444 SFC1	915 Twnc1	240 WUA	
Site Development - Grading (1,151,000 cu. yd.)	0.27/cu. yd.								310,500
Site Development- Road Construction (58,000 ft.)	63/ft.	63/ft.	72/ft.	90/ft.	570,780	1,230,800	1,844,640	324,000	3,970,220
Site Development- Residence Construction	3,825/ unit	2,841/ unit	2,048/ unit	1,363/ unit	577,575	1,261,404	1,873,920	327,120	4,040,019
Construction inputs - Residential	14,511/ unit	11,056/ unit	7,452/ unit	6,070/ unit	2,191,161	4,908,864	6,818,580	1,456,800	15,375,405
Construction inputs-retail	6.5/sq. ft. X 78,400 sq. ft.								509,600
Construction inputs-school	0.162/dollar X \$1,500,000								243,000
Construction inputs-sewage	0.162/dollar X \$4,810,000								779,220
Operation inputs - residences (20 years)	46,700/ unit	46,700/ unit	35,100/ unit	30,000/ unit	7,051,700	20,734,800	32,116,500	7,200,000	67,103,000
Operation inputs - utility infrastructure (20 years)	862/ unit	760/ unit	623/ unit	551/ unit	130,162	337,446	570,045	132,240	1,169,887
Operation inputs - retail (78,400 sq.ft.)(20 years)	83.8/sq.ft.								6,569,920
Operation inputs - school (35,000 sq.ft.)(20 years)	17.34/sq.ft.								606,900
Operation inputs - sewage (20 years)	2,072,300 KWHr/yr.-.034/KWHr								1,409,164
Transportation (18 mpg, 181,710 vmt/day, 20 yrs.)	1.52/gallon								112,014,120
TOTAL - 20 years									214,100,955

SFD=single family detached SFC1=single family clustered Twnc1=townhouse clustered WUA=walkup apartments

Source for Energy Inputs: Interactive Resources, Inc., 1976 (See References).

back-up systems are usually required.

The complete solar house (including space and water heating) would reduce operational energy consumption by 77%. In the case of Northbluff this would save approximately 29,525 therms per unit and reduce residential operation energy inputs from 31% of total consumption to 95%. In addition to savings of energy dollars, a personal income tax deduction of 55% of the purchase price of solar equipment (up to a maximum of \$3,000) is available as a combination of state and federal tax incentives.

Throughout spring and summer months in the Livermore area, prevailing westerly winds are consistent and fairly strong. Wind prospecting on the site may reveal that the ridge area is suitable for wind power generation. Wind energy can be exploited in two ways: mechanically to pump water and sewage or it can be converted to generate electricity. Since wind blows intermittently, and because long term storage is not yet feasible, windmills would have to be tied in to P.G. and E.'s electric grid system. In this way, the system can use wind energy when it is available and switch to conventional electricity during periods of calm, thus providing uninterrupted service. Wind Energy Conversion Systems (WECS) to serve more than a few residences can be set up in multiple units, known as wind farms. Each WECS can produce 150,000 kilowatt-hours annually in windy areas.

Alameda County Board of Supervisors recently approved two wind farms, one with 200 WECS's and one with 300 WECS's near the Altamont Pass. More applications are pending, showing the acceptance and feasibility of WECS operation. The 200 WECS facility will generate electricity sufficient for 4,000 typical California homes. There are, however, significant problems in using wind energy. The initial cost is high, and if wind is not sufficiently strong or constant the system may not be economical. Additional investigation would be needed to determine if this specific site is suited to wind power development. P.G. and E. will now investigate the wind energy potential of a site as will other private wind prospecting companies or the applicant may rent the necessary equipment and investigate the site's potential himself. Safety and interference with radio and television signals are impacts of WECS operation that can be mitigated by siting the machines away from residences and using non-conducting fiberglass as the blade materials. Also, lower profile machines are now available. Aesthetic impacts can be partially solved through careful siting of WECS's.

Transportation is the largest component (53%) in terms of the

project's energy use. To mitigate this impact, some form of mass transit could be extended to the area. BART has plans to extend its services to the Livermore-Amador Valley, which might alleviate some of the transportation inputs. Another possibility involves the operation of shuttle buses or car pools by the homeowners's association. Also, proper allocation of essential goods and service facilities in the commercial space, would further reduce transportation by private automobile. Beyond these measures, little can be done to mitigate transportation energy use, because of the project's location. Refer also to the Transportation/Circulation section.

Alameda County now requires the developer to incorporate a number of energy conservation measures in residential construction to qualify for P.G. and E's Energy Conservation Home Program. A minimum of 50 points is required to qualify. P.G. and E. estimates 20% and 30% reductions in residential operation energy use with 50 and 100 points respectively. With a 30% reduction, residential operation is reduced by 20,120,900 therms over 20 years, or a 11,497 therms savings per unit. Some additional measures that would reduce residential operation energy use include:

- 1) Use of deciduous landscaping to protect houses from sun, but allow winter sun penetration to warm houses. Use of removable overhangs on sun-struck windows for use in warm weather and use of landscaping as a windbreak to minimize energy loss from climatic conditions.
- 2) Orientation of lots and buildings with regard to the sun. Use of warm thermal belts midway on slopes, larger window areas facing winter sun, and protection (through shade or awnings) from summer sun.
- 3) Design of attics for good ventilation.
- 4) Use of windows that open.
- 5) Orientation of entryways and long unshielded wall and window areas away from prevailing winds.
- 6) Provision of skylights.

Construction inputs, the third largest component, can be reduced by minimizing earth moving, using efficient machinery, and properly maintaining equipment.

Additional energy can be saved by minimizing paved areas and road widths, minimizing length of drainage and utility

lines, using energy efficient building materials (such as wood instead of aluminum) and educating residents as to the need for energy conservation.

D. Site - Cultural Environment

1. Land Use

a. Setting

The site is currently used to grow domestic grains and grasses, with certain portion used as pasture.

b. Impacts

The project would transform land use on about 2/3 of the site to urban uses, including housing at varying densities, a commercial area, a school, and a sewage treatment plant. The upper 1/3 of the site would be used to raise crops irrigated by treated affluent. Urban development would cause the loss of highly rated soils for dry-farmed grain and grain hay, as well as range pasture. Proposed land uses may conflict with adjacent agricultural uses, possibly causing premature pressure for urbanization.

c. Mitigation

Land Use Impacts are unmitigable if the project is implemented.

2. Transportation/Circulation

The following analysis is based on reports by DKS Associates (See References) Consulting Traffic Engineers, with review and input from Alameda County Planning Department, Alameda County Road Department, and Cal Trans. Analysis is made for years 1986 and 2005. 1986 is the estimated project completion date and reflects impacts the project would have on the local roadway network. The conjectural 2005 analysis is included to indicate worst case impacts within the Northbluff vicinity if the town of Las Positas and other nearby lands were developed.

a. Setting

Regional access to the project is provided by I-580, an east-west freeway route linking the San Francisco Bay plain with the San Joaquin Valley. I-680, a north-south freeway route linking Fremont, San Jose and points south with Walnut Creek and points north, intersects I-580 freeway 5.5 miles west of the site at Dublin. Direct freeway access to Northbluff is obtained via the I-580/Airway Boulevard interchange. Collier

Canyon Road Fronts the site from the interchange extending east, then north approximately 5.5 miles into Contra Costa County to Highland Road. Collier Canyon Road provides access to the Valley Campus of Chabot College, and also serves scattered rural residences and farms in Alameda County. Collier Canyon Road has a 30' to 38' pavement width in a 42' to 60' R/W. Current traffic volumes of \pm 3,600 trips per day are well within its capacity. Peak hours, with 250 - 330 trips, fluctuate during the day, depending on class schedules. Nearly all drivers find freedom of operation along the route. Doolan Road is a dead-end rural road extending 3.76 miles and serving scattered residences and farms. Doolan Road fronts the site from the interchange extending west and then north. It has 20' to 22' of pavement width in a 50' to 60' R/W, and carries an insignificant amount of traffic. (Alameda County Road Division, 1976-1977).

b. 1986 Impacts

As shown on the Land Use Development Plan, Figure 4, the Northbluff circulation network is centered on the realignment of Collier Canyon Road into a divided four-lane arterial connecting the I-580/Airway Boulevard interchange with the Valley Campus of Chabot College. This arterial provides direct access to I-580 for all project trips and is much less circuitous to the College Campus than the present alignment, reducing the distances to the Campus entrance by 1,500'. The portion of Collier Canyon Road between Doolan Canyon Road and Airway Boulevard is relocated 1,100' to the north to provide better separation from the Airway Boulevard/I-580 interchange. A system of residential collector streets and minor streets connecting with new Collier Canyon Road provide the balance of the project's circulation system. Superceded portion of Doolan Canyon Road and Collier Canyon Road right-of-way are proposed to be used for the revised westbound freeway on and off ramps. 4,500' of the existing Collier Canyon Road extending south from the Campus entrance would be retained for access to existing residences. Freeway access for the more southerly homes will be less convenient.

To properly ascertain the impact Northbluff would have on the local roadway network, base traffic conditions for the estimated project completion date of 1986 were determined. The Table 10 presents 1986 peak hour trip data for significant trip generators in Northbluff and in nearby developments. Trip generation rates upon which peak hour data are based are shown on Table 11.

An annual growth rate of 2.5 percent was applied to existing traffic that was not bound for the Valley Campus. Table 10 also shows estimated traffic that would be generated with 100 percent occupancy of the business park presently under construction in the southeast quadrant of the freeway

Table 12

1986 TRIP GENERATION -- NORTHBLUFF AND NEARBY DEVELOPMENTS

<u>Project</u>	<u>Land Use</u>	<u>Size</u>	<u>ADT</u>	<u>AM Peak Hour In/Out</u>	<u>PM Peak Hour In/Out</u>
Northbluff	Residential:				
	Single Family	151 units	1510	40/80	100/50
	Zero Lot Line	444 units	4440	120/240	290/150
	Townhouses	915 units	6860	170/520	550/270
	Condominiums	240 units	1680	40/130	130/70
	Commercial	6 acres	<u>5700</u>	<u>85/85</u>	<u>370/370</u>
Total Northbluff			20190	455/1055	1440/910
Business Park*	Warehouse, R&D, Office, Other	80 acres	6240	850/90	240/700
Valley Campus	College Campus	-	-	160/20	50/30

*This is the business park on the southeast quadrant of the 1-580/Airway Boulevard interchange.

Table 13

TRIP GENERATION RATES

<u>Project</u>	<u>Land Use</u>	<u>ADT</u>	<u>Peak Hour AM</u>	<u>% of ADT PM</u>
Northbluff	Residential:			
	Single Family	10.0/unit	8	10
	Zero Lot Line	10.0/unit	8	10
	Townhouse	7.5/unit	10	12
	Condominiums	7.0/unit	10	12
	Commercial	950/gross acre	3	13
Business Park	Warehouse, R&D,	78/net acre	15	15
	Office, Other			

Sources:

ITE Trip Generation Manual

Planning Department, County of Alameda, in-house trip generation research

Planning Department, City of Livermore (Leon Horst)

interchange. The business park is projected to generate peak hour traffic volumes approximately one-half as great as the Northbluff project and would also impact the I-580/Airway Boulevard interchange. The Valley Campus of Chabot College currently has no plans for expansion. A scenario of a 50 percent increase over present enrollment by 1986 was used in analysis, however, to reflect possible enrollment increases with minimal new building construction.

Traffic Diagrams 1 and 2 (Traffic Diagrams follow this section) present the projected year 1986 AM and PM peak hour traffic volumes on the existing street network without Northbluff. Also shown are the intersections' approach lane configurations for the existing street network. These projections are based on discussions with local public officials and developers, and reflect the most current thinking on development plans.

Traffic Diagrams 3 and 4 present the total year 1986 AM and PM peak hour traffic volumes with the Northbluff project completed. These volumes assume that the existing Airway Boulevard/I-580 interchange remains unchanged. Also shown are the lane configurations for the base street network.

Field studies of existing traffic operations conducted by DKS Associates showed that several backups at both off ramps occurred during the AM and PM peak hours. These conditions would deteriorate by 1986 even without Northbluff, as nearby land is developed and additional traffic generated. Without Northbluff, by 1986 the two I-580 on-off ramp intersections with Airway Boulevard would require STOP sign control on all three approaches. Intersection number 3 (the eastbound on/off ramp intersection) would approach capacity. Currently, STOP signs control only the off-ramps.

Table 12 presents the volume/capacity ratios calculated for the 1986 AM and PM peak hour for the critical intersections examined. Table 13 provides a brief description of the subjective interpretation of these volume/capacity ratios (V/C). AV/C ratio greater than one indicates an inability of the intersection to adequately service the traffic volumes. These ratios are calculated using the critical lane summation technique.

The completion of Northbluff by 1986 would result in additional traffic on these local intersections. Realignment of Collier Canyon Road would result in smoother traffic operations than the existing "T" intersection provides by reducing the number of turning movements, providing a less circuitous route to the campus, tripling the distance from the westbound ramp intersection, and by providing numerous project access points to the main arterial. The proposed four lane width also ensures smooth and safe uninterrupted traffic flow to and from

Table 14

VOLUME TO CAPACITY RATIOS -- YEAR 1986

<u>Intersection No.</u>	<u>Peak Hour Time Period</u>	<u>Without Project*</u>	<u>With Project</u>	
			<u>Base Road Network*</u>	<u>Modified Road Network**</u>
1	AM	.41	.59	.59
	PM	.18	.46	.46
2	AM	.51	.94	.40
	PM	.53	1.48	.59
3	AM	.95	1.26	.88
	PM	.93	1.68	.86
4	AM	NA	.24	.24
	PM	NA	.13	.13

* Assumes existing street network and lane configurations.

** Assumes interchange modification and lane additions (see text).

Table 15

LEVEL OF SERVICE INTERPRETATION

<u>Level of Service</u>	<u>Description</u>	<u>Delay Range (Sec. per Vehicle)</u>	<u>Volume to Capacity Ratio Percent</u>
A	Excellent operation. All approaches in intersections appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	0-16	0-60
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	16-22	60-70
C	Good operation. Occasionally drivers may have to wait through more than 60 seconds, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted.	22-28	70-80
D	Fair operation. Cars are sometimes required to wait through more than 60 seconds during short peaks. There are no longstanding traffic queues. This level is typically associated with design practice for peak periods.	28-35	80-90
E	Poor operation. Some longstanding vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	35-40	90-100
F	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	40 or greater	Over 100

Source: Based on National Academy of Sciences, Highway Capacity Manual, 1965 and the update of the manual.

the College Campus.

Table 12 also summarizes the 1986 V/C ratios for the critical intersections with completion of the project. The three intersections with Airway Boulevard (See Traffic Diagrams 3 and 4) would meet signal warrants. Traffic Table 3 also indicates that, given the existing base street network shown on Traffic Diagrams 1 to 4, significant congestion would occur at intersections with the I-580 on-off ramps. The north intersection of the collector street with the new Collier Canyon Road (intersection number 4) would operate quite well without a signal.

An analysis examining back up lengths on critical approaches to the intersections with Airway Boulevard was also conducted. This indicated that the back ups would periodically extend upstream to the next intersection thereby disrupting traffic flow at those locations. Intersection 4 would experience no problems.

The ability of the new Collier Canyon Road to handle traffic volume increases due to maximum buildout conditions of the Valley Campus was briefly examined. Those conditions are at least 20 to 30 years in the future and depend on funding, student population and other factors. The planned maximum student population of 15,000 would generate approximately quadruple the traffic it does today. The planned cross section of new Collier Canyon Road (four-lanes with left turn pockets) would, however, be able to service this traffic.

c. Mitigation - 1986 Impacts

To ameliorate these projected traffic problems, changes in the base street network were examined. This analysis resulted in the recommendation of the widening of the ramp intersection approaches and realignment of the westbound I-580 on and off ramps. Traffic Diagrams 5 and 6 present this new network along with a reassignment of the AM and PM traffic volumes. This realignment eliminates the existing northbound left turn used to enter the westbound I-580 on ramp and replaces it with a northbound right turn loop. Safety and efficiency are improved. This realignment would accommodate a commute transit stop for westbound buses adjacent to the westbound freeway on ramp. A similar stop could be located between the eastbound on and off ramp for eastbound buses.

Presented earlier, in Table 12, were the volume/capacity ratios for the critical intersections with this new network. All of the intersections operate satisfactorily. The analysis of

back up lengths on intersection approaches also showed marked improvement over the base network through the elimination of upstream traffic conflicts.

To ensure maintenance of smooth traffic flow at the I-580 interchange the freeway modifications discussed above must be implemented before traffic generated by Northbluff and nearby developments reach a congested level. The proposed Northbluff phasing, shown in Table 14, in conjunction with phasing of nearby developments (ascertained from jurisdictions and developers involved, plus Chabot College), was examined for total traffic generated up to and including the project buildout year of 1986.

TABLE 16

PROPOSED NORTHBLUFF CONSTRUCTION PHASING -- NUMBER OF RESIDENTIAL UNITS

Phase	Single Family Detached	Zero Lot Line	Townhouses	Condominiums	Total
1	73	49	90	--	212
2	78	168	--	--	246
3	--	80	120	--	200
4	--	85	395	--	480
5	--	62	155	120	337
6	--	--	155	120	275
TOTALS	151	444	915	240	1,750

Given these development assumptions, Table 15 was developed. It shows minor and major roadway improvements that can be implemented to maintain smooth traffic flow in the Airway Boulevard/I-580 interchange areas at or better than Level of Service C. The interchange realignment is not necessary until construction of Phase 6 is begun. To accomplish appropriate staging, approval, if granted, could be conditioned to a certain time table of improvements to be completed prior to occupancy of units in various phases of development.

TABLE 17

STAGING OF ROADWAY IMPROVEMENTS

<u>Northbluff Phase</u>	<u>Roadway Improvements</u>
1	. None necessary.
2	. Install three-way STOP signs at both Airway Boulevard intersections with I-580 off-ramps/ on-ramps.
3	. Install northbound left turn lanes at both of above intersections. . Inatall southbound right turn lane on Airway Boulevard at westbound I-580 on-ramp.
4	. Install eastbound right turn lane on the east-bound I-580 off-ramp to Airway Boulevard.
5	. Install additional left turn lanes on the east-bound I-580 off-ramp to Airway Boulevard.
6	. Realign Airway Boulevard/I-580 interchange to configuration schematically shown in Figures 5 and 6. . Close existing Collier Canyon Road intersection with Airway Boulevard. . Extend new Collier Canyon Road directly to Chabot College.

Mitigation of impacts on internal traffic operations within the Northbluff Development can be achieved by the following measures:

- 1) Along new Collier Canyon Road left turn pockets and transition lengths should be a minimum of 150 feet and preferably 200 feet long. Consecutive minor intersections should be at least 400 feet apart. The road should have shoulders.
- 2) The Collector Road is adequate to serve project traffic needs except at the intersection with new Collier Canyon Road. There a 60 foot curb-to-curb width on both east and west sides of the intersection for a distance of 600 feet will provide an adequate number of approach lanes. The added width will also allow for an eastbound left turn.

lane for traffic entering the proposed Recreational Center located on the east side of New Collier Canyon Road. On the westside, the added width will provide space for a westbound left turn lane for traffic bound for the commercial area.

- 3) The portion of the Collector Road west of Airway Boulevard that fronts the commercial acreage should have access/egress points only for the commercial traffic. Specifically, no residential entrances should be located opposite this acreage.
- 4) New Collier Canyon Road should have no streets or driveways which access it within 400 feet of the intersection with the Collector Road. Therefore, the "T" intersection on the current PBR plan located immediately north of this intersection should be relocated either further north along new Collier Canyon Road or to the Collector Road west of the commercial acreage. Access to the proposed Recreational Center should be located at the southeast corner of the Center.
- 5) Developer must install traffic signals at major intersections (on/off ramp of Airway Boulevard, Collier Canyon Road and Collector Road) and other intersections where warrant studies indicate.

Inconveniences in access to nearby landowners caused by proposed realignment of Collier Canyon Road can be mitigated by opening through properties to internal streets in the Northbluff project. These small outholdings should be incorporated in the overall planning effort to provide consistency and equity in area land use.

Public transit and car pool programs could mitigate traffic impacts. Provision of public transit to the project could divert up to 10% of peak hour auto trips and thereby reduce congestion. Negotiations should take place between the developer, AC Transit, BART and Alameda County to explore possibilities of bus service to the project. Developer could promote the RIDES Car Pool and Van Pool Program in its sales office and through the project's homeowners' association. Car pool parking could be provided in an area near the Airway Boulevard interchange. School bus service should be provided for all areas of the project if an elementary school is not provided in Northbluff; otherwise, school trips are a major traffic generator.

d. FUTURE TRAFFIC IMPACTS - YEAR 2005

The intent of the analysis is to give an indication of impacts

on the roadway network which would occur by the year 2005 in the influence area of Northbluff if the town of Las Positas and other nearby lands north of I-580 were developed. Land use assumptions in the area are highly conjectural since, except for Northbluff and the community college, the area north of I-580 isn't designated for urban development by Alameda County or Livermore General Plans. This analysis identifies future right-of-way implications these developments would have on the Airway Boulevard interchange and the realigned Collier Canyon Road in an effort to prevent obstruction of reasonable access for these developments through the Northbluff area while at the same time protecting an acceptable level of service and liveability for future residents of Northbluff. Traffic discussed in this section reflects worst case assumption for traffic using the described system. It is not the responsibility of the Northbluff developers to provide improvements necessary to accommodate the possible large developments. Analysis is included so that right-of-way to accommodate possible future developments may be protected in the Northbluff design.

Las Positas would be a town of 40,000 to 45,000 people with 15,000 housing units; its location is planned to be northeast of Northbluff and north of Livermore. The residential development (estimated at 350 acres) is assumed to be located in the intervening area between Las Positas and I-580 directly east of Northbluff. Eight residential units per acre have been assumed, giving a total of 2,800 housing units. Light industrial development (estimated at 120 acres) is assumed to be located west of Northbluff, north of I-580, to the west of Doolan Road. Locations of these developments are illustrated in Traffic Program 7. (Adolph Martinelli, 1981).

A basic street network, including several new roads, essential for projected 2005 development, has been assumed. Extension of Isabel Avenue, from Stanley Boulevard to Kitty Hawk Road, is not included. Roads included are those described below and portrayed in Traffic Diagram 7.

- Road A (Northbluff property road) - parallel and north of I-580 from New Collier Canyon Road to Doolan Canyon Road.
- Road B - parallel and north of I-580 and immediately south of Chabot College Campus from new Collier Canyon Road to the new town of Las Positas.
- Extension of Portola Avenue north to the new town of Las Positas and a full interchange at Portola Avenue and I-580.
- Eastbound I-580 entrance ramps from northbound Airway Boulevard.
- The roads as proposed for the Northbluff development.

Projected 2005 traffic is illustrated in Table 16. Las Positas was estimated to generate 185,200 vehicle trips per day with AM peak hour volumes of 15,857 and PM peak hour volumes of 19,657. The residential development would generate an estimated 25,200 vehicle trips per day with 2,268 and 2,773 trips during the AM and PM peak hours, respectively. The industrial development would generate 14,400 vehicle trips per day and 1,641 and 1,455 trips during the AM and PM peak hours, respectively.

For Las Positas, earlier studies done by Wilsey and Ham, Planners and Engineers (1973) were used to distribute the new town's traffic onto the roadway system. The trip distribution as presented in Table 17 was slightly revised from their work (Adolph Martinelli, 1981). This was done because the internal trip distribution of 30 percent of the total trips was considered high and was therefore reduced to 20 percent. The remaining 10 percent was distributed as shown. The results showed that 40 percent of all trips from the new town of Las Positas will be destined to or will originate from the west of Las Positas.

This demand of 40 percent to the portion of the Bay Area west of Las Positas was checked with a special census that was done in the City of Dublin in 1976. The census indicated similar demands.

The traffic associated with Las Positas was distributed onto the future street network shown in Traffic Diagram 7 without the Portola Avenue extension and the full interchange at Portola Avenue and I-580. Therefore, access to the areas west from Las Positas can be made via either the New Collier Canyon Road or via Livermore Avenue. Wilsey & Ham estimated that 60 percent of the traffic due west will access the New Collier Canyon Road/Airway Boulevard and I-580 interchange. This was considered reasonable and hence the critical traffic volumes of this interchange which are associated with Las Positas are: 0.40 x 0.60 x peak hour volumes as shown in Traffic Diagram 8.

Vehicle trip distribution for the residential and industrial developments were discussed with the Alameda County Planning Department and conclusions were that 30 percent of the traffic associated with each of these developments will access the Airway Boulevard and I-580 interchange to travel to the area west of the site. In addition, 10 percent of the traffic associated with the industrial development will access this interchange for areas east of the development. Similar to the Las Positas traffic, the traffic associated with these developments was distributed onto the year 2005 street network without the Portola Avenue extension and a full interchange at Portola Avenue and I-580. Critical traffic

Table 18

TRIP GENERATION FOR LAS POSITAS, 350 ACRES OF
RESIDENTIAL AND 120 ACRES OF INDUSTRIAL DEVELOPMENT

LAND USE*	TRIP GENERATION RATE **		
	Daily	% AM (%IN/&Out)	(%)
1 <u>LAS POSITAS</u>			
i) 15,000 Housing Units -2900 Acres	9 Trip Ends/Unit	9 (34/66)	1
ii) 60 Acres of Commercial Use	400 Trip Ends/Gross Acre	3 (50/50)	9
iii) 500 Acres of Industrial Use (Light Industrial and Offices)	52.4 Trip Ends/Gross Acre	11.4 (85/15)	10.1
2 <u>RESIDENTIAL DEVELOPMENT</u>			
350 Acres @ 8 Units an Acre	9 Trip Ends/Unit	9 (34/66)	11
3 <u>INDUSTRIAL DEVELOPMENT</u>			
120 Acres of Light Industrial Use	52.4 Trip Ends/Gross Acre	11.4 (85/15)	10.1

* Source: Alameda County Planning

** Source: ITE Trip Operation Manual and Alameda County Planning

Table 19

DIRECTIONAL VEHICLE TRIP DISTRIBUTION - LAS POSITAS

	From Las Positas Report By Wilsey & Ham*	Revised** (9-15-81)
Within Las Positas	30%	20%**
Livermore Industrial Complex	25%	28.6%
City of Livermore and Other	5%	5.7%
East Valley	5%	5.7%
Bay Area, Dublin and Other Areas West	35%	40%

* Las Positas New Town: Proposed Amendment to the Alameda County General Plan; Wilsey & Ham, 1973.

** Source: Alameda County Planning, Adolf Martinelli.

volumes at the Airway Boulevard and I-580 interchange are shown in Traffic Diagram 8.

Critical intersections within the vicinity of the Northbluff Development as identified in Traffic Diagram 8 are the intersection of the I-580 eastbound on- and off-ramps at Airway Boulevard during the PM peak hour and the intersection of New Road 'A' and the Collier Canyon Road during the AM peak hour. These intersections were analyzed with the projected traffic volumes and the roadway geometrics as proposed for the Northbluff development (Traffic Diagram 6). The analysis indicated that of these two intersections, the intersection of the I-580 eastbound ramps and Airway Boulevard was critical with a level of service 'F' ($V/C = 1.48$) during the PM peak hour. The intersection of New Road 'A' and New Collier Canyon Road was calculated to operate at level of service F ($V/C = 1.51$) during the AM peak (for details see Traffic Diagram 9).

The analysis demonstrates that these critical intersections will operate under acceptable levels of service 'C' only if the following roadway geometrics are provided:

Eastbound I-580 Ramps at Airway Boulevard

- . four (4) left turn lanes on the eastbound off-ramp at Airway Boulevard.
- . six through lanes on Airway Boulevard.

New Road 'A' and New Collier Canyon Road

- . eight through lanes on New Collier Canyon Road.
- . three left turn lanes westbound on the Collector Street.
- . two right turn lanes eastbound on New Road 'A'.

The above roadway geometrics which would be required to provide a level of service 'C' indicates that the traffic demand associated with Las Positas and the residential and industrial development will require an additional access point to and from I-580 west. Furthermore, the access is primarily warranted due to traffic associated with the new town of Las Positas which has been estimated as 61 percent of the total inbound traffic from the areas west of Northbluff during the PM peak hour at the Airway Boulevard and I-580 interchange. The most likely location of this additional access is at the existing partial interchange of Portola Avenue and I-580 where access to and from I-580 west

already exists to and from the south. It may also be possible that a full interchange may be warranted at the Portola Avenue interchange. Detailed analysis of this option, however, was beyond the scope of this project.

An additional benefit of the extension of Portola Avenue north of I-580 will be the provision of a more direct route to Chabot College for Livermore residents.

Since this analysis indicates the necessity of the additional interchange at or in the vicinity of Portola Avenue, the interchange will be considered as part of the year 2005 roadway network. The traffic was redistributed accordingly which then allowed the consultant to analyze the traffic scenario for the year 2005 within the vicinity of Northbluff.

The intersection of I-580 eastbound ramps and Airway Boulevard is the most critical intersection in that only so many vehicles can exit I-580 eastbound to northbound Airway Boulevard during the PM peak hour. Therefore, the maximum number of vehicles which will use New Collier Canyon Road was calculated based on the capacity of the I-580 eastbound off-ramp at Airway Boulevard. Assuming a maximum of two eastbound left turn lanes at the off-ramp, up to 2340 PM peak hour vehicles could exit the freeway and turn north. The remainder, 1350 PM peak hour vehicles (two traffic lanes worth) will be diverted to the new interchange at Portola Avenue. This calculation assumed level of service 'E' as capacity. Traffic Diagram 10 shows the geometrics used for this calculation.

The traffic volumes associated with Las Positas and the two developments for both the AM and PM peak hour assumed to use the Airway Boulevard/I-580 interchange were reduced by 50 percent and the traffic was distributed accordingly. The resulting traffic volumes are shown in Traffic Diagram 11.

The recommended roadway geometrics shown on Traffic Diagram 10 were based on providing a minimum level of service of 'C' on the roadways within the vicinity of Northbluff. The corresponding roadway cross sections are shown on Traffic Diagram 12.

The analysis demonstrated that the existing three lane bridge will need to be widened over I-580 at Airway Boulevard to provide two southbound and three northbound lanes. In addition, a new eastbound on-ramp would replace the left turn to the existing loop on-ramp.

The right-of-way of 110 feet for New Collier Canyon Road as proposed earlier for the Northbluff development is sufficient for the roadway north of the Road 'A'/Collector Street intersection (see Traffic Diagrams 10 and 12). This assumes that no shoulder is

provided on the six lane section. South of Road 'A' 146 feet of right-of-way will be required to accommodate the additional traffic lanes. New Road 'A' should be a four lane divided arterial between New Collier Canyon Road and Doolan Road (Section A - Traffic Diagram 12). Ultimately Road A should be extended westward to Fallon Road for access onto I-580 and abandon the partially completed frontage road north of the freeway. East of New Collier Canyon Road, the proposed Collector Street should also be a four lane divided arterial for several hundred feet. East of this point, the road can transition to a typical Collector Street right-of-way.

To ensure no overloading at the interchange of I-580 and Airway Boulevard, the street network of Las Positas should be laid out to limit number of vehicles that will use New Collier Canyon Road to 1100 during the peak hour. This can be achieved by making new Road B very circuitous such that travel times to I-580 via Portola Avenue would be equal to or shorter than travel via New Collier Canyon Road.

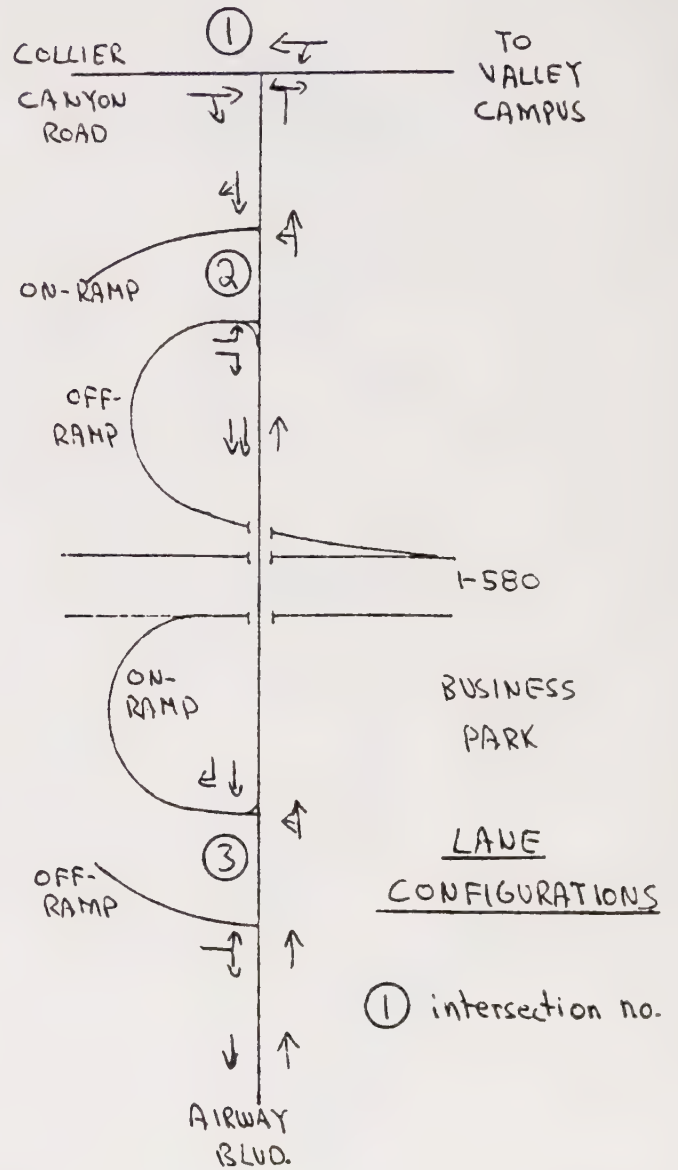
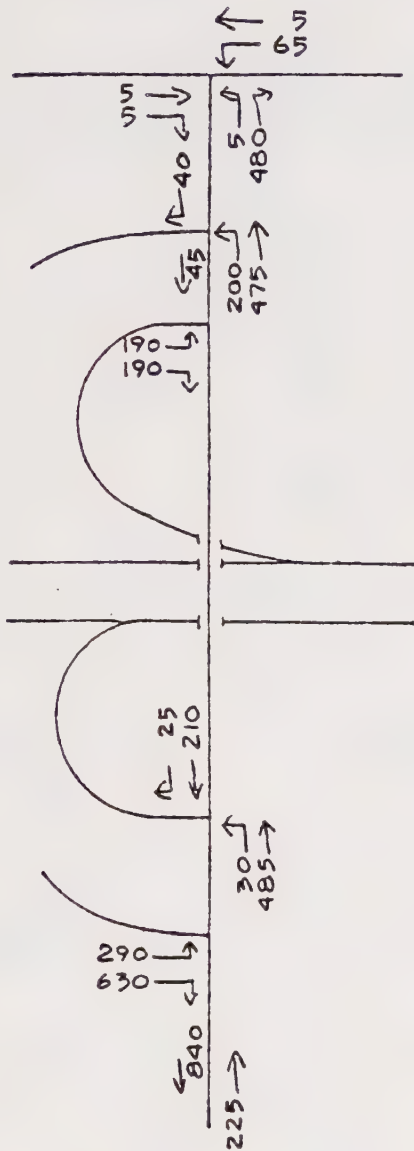
Daily traffic estimated for I-580 within the vicinity of Airway Boulevard by the year 2000 was obtained from Caltrans (Ernie Cohen). One hundred thousand vehicles per day has been estimated on I-580 by the year 2000. Two volumes were available for the year 1980, east and west of the Airway Boulevard which allowed the consultant to generate an annual growth rate and hence obtain an estimate for the year 2005. The traffic of Las Positas was not included in the year 2000 estimate, hence it has added accordingly.

The ADT estimates for the year 2005 east of Airway Boulevard are 186,000 vehicles (8,900 vehicles during peak hour in the peak direction) and west of Airway Boulevard 152,000 vehicles (7,300 vehicles during the peak hour in the peak direction).

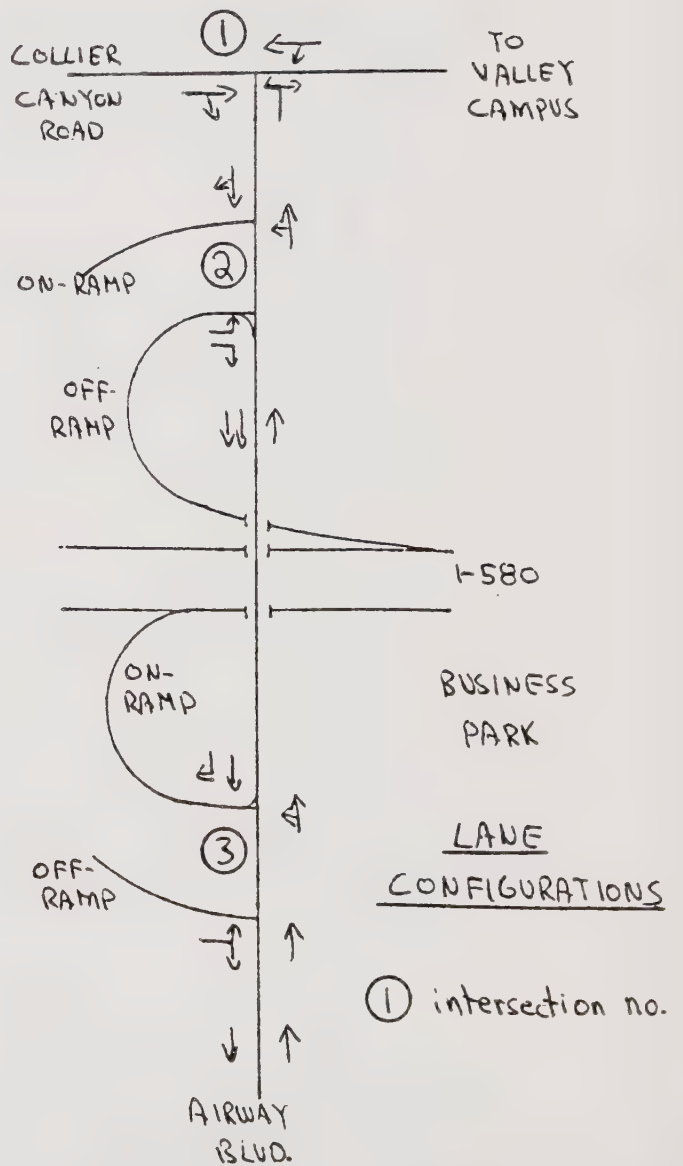
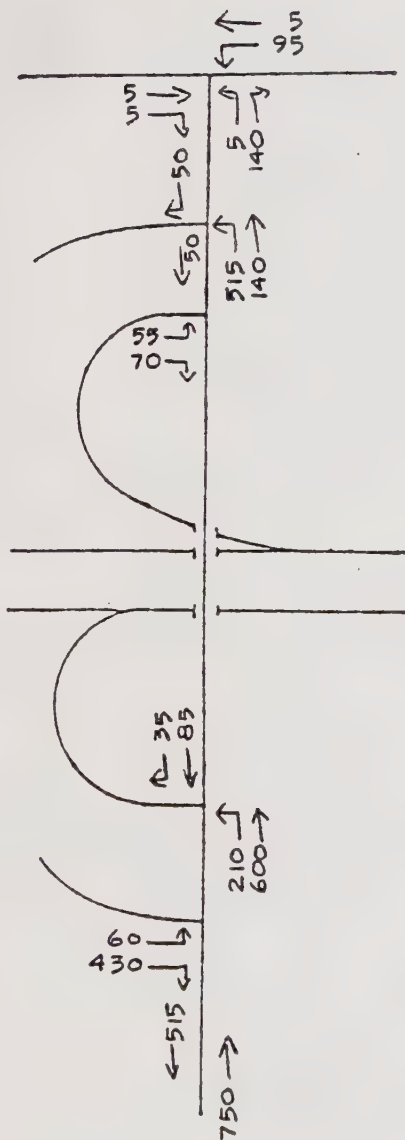
The capacity analysis for the eight lane freeway indicated that I-580 will operate at level of service 'F' ($V/C = 1.12$) west of Airway Boulevard and at a level of service D-E ($V/C = 0.91$) east of Airway Boulevard. Long range plans call for the extension of BART to Livermore. This extension is expected to attract 34,000 riders per day and this would reduce the projected congestion on I-580. (De Leuw Cather & Company, 1975).

e. Conclusions of 2005 Traffic Analysis

- . A four lane divided arterial is adequate to accommodate year 2005 traffic from a point midway between the New Road A/New Collier Canyon Road intersection and the north Collector Street/New Collier Canyon Road intersection to the old Collier Canyon Road intersection with New Collier



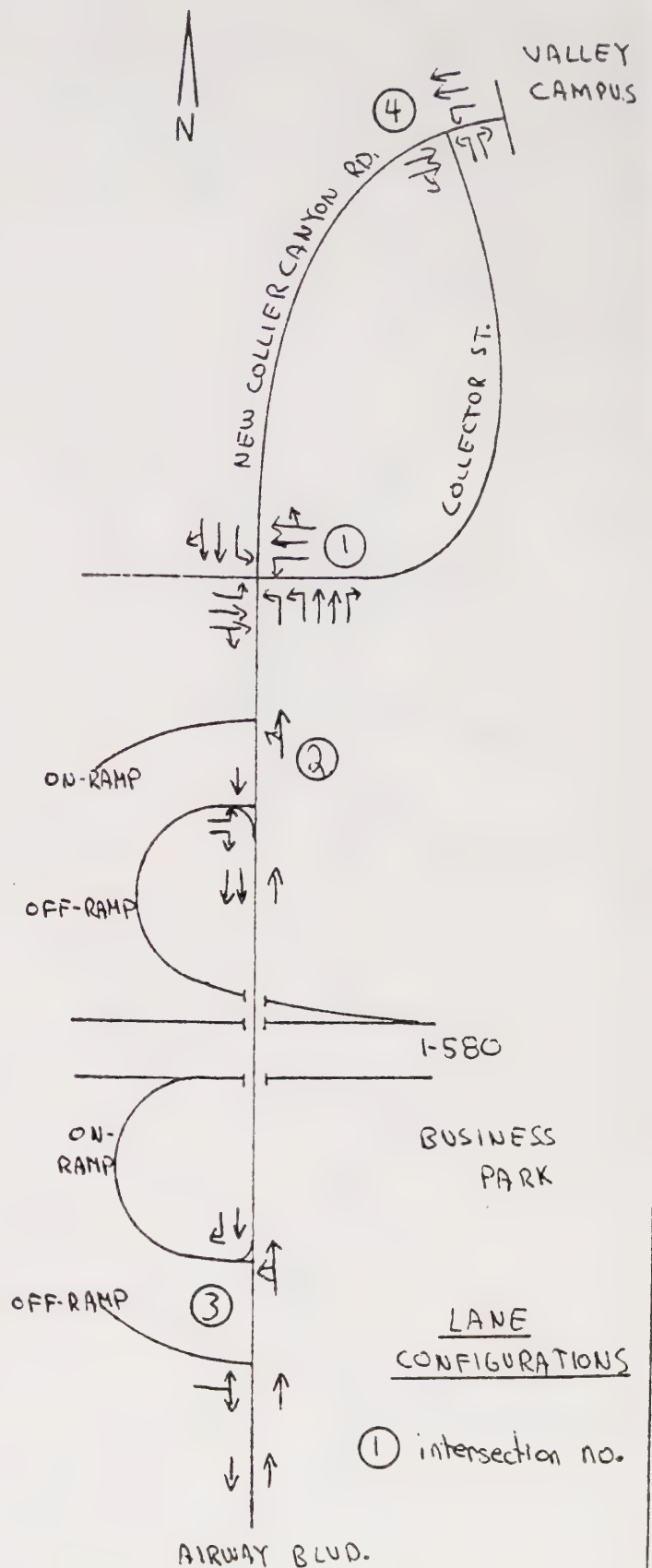
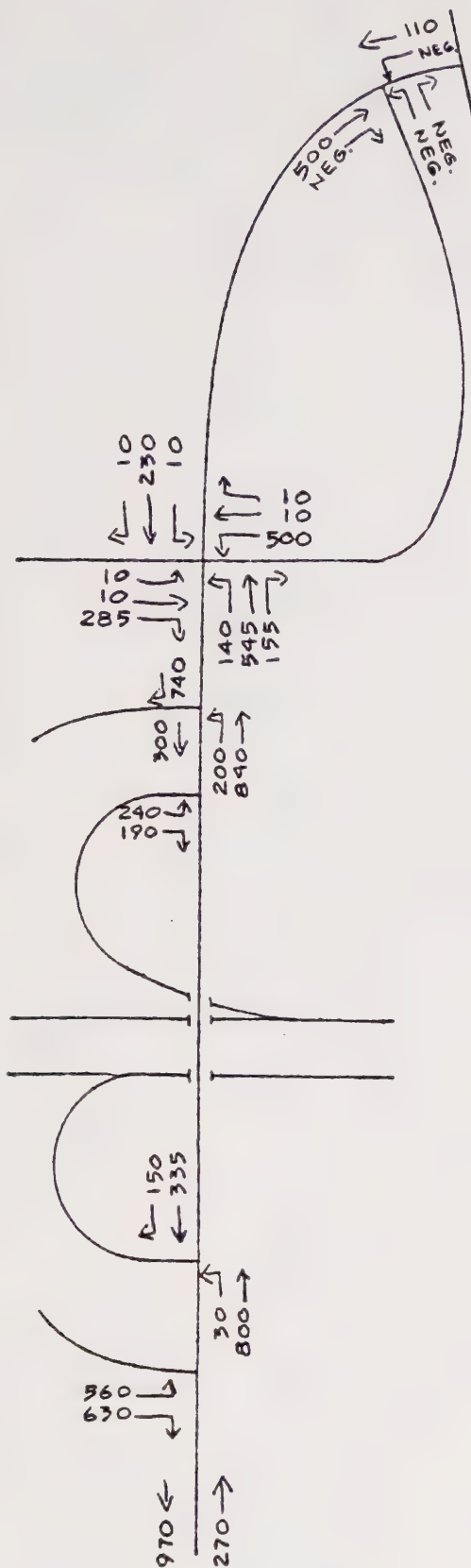
TRAFFIC DIAGRAM 1
1986 TRAFFIC VOLUMES
WITHOUT PROJECT
AM PEAK HOUR



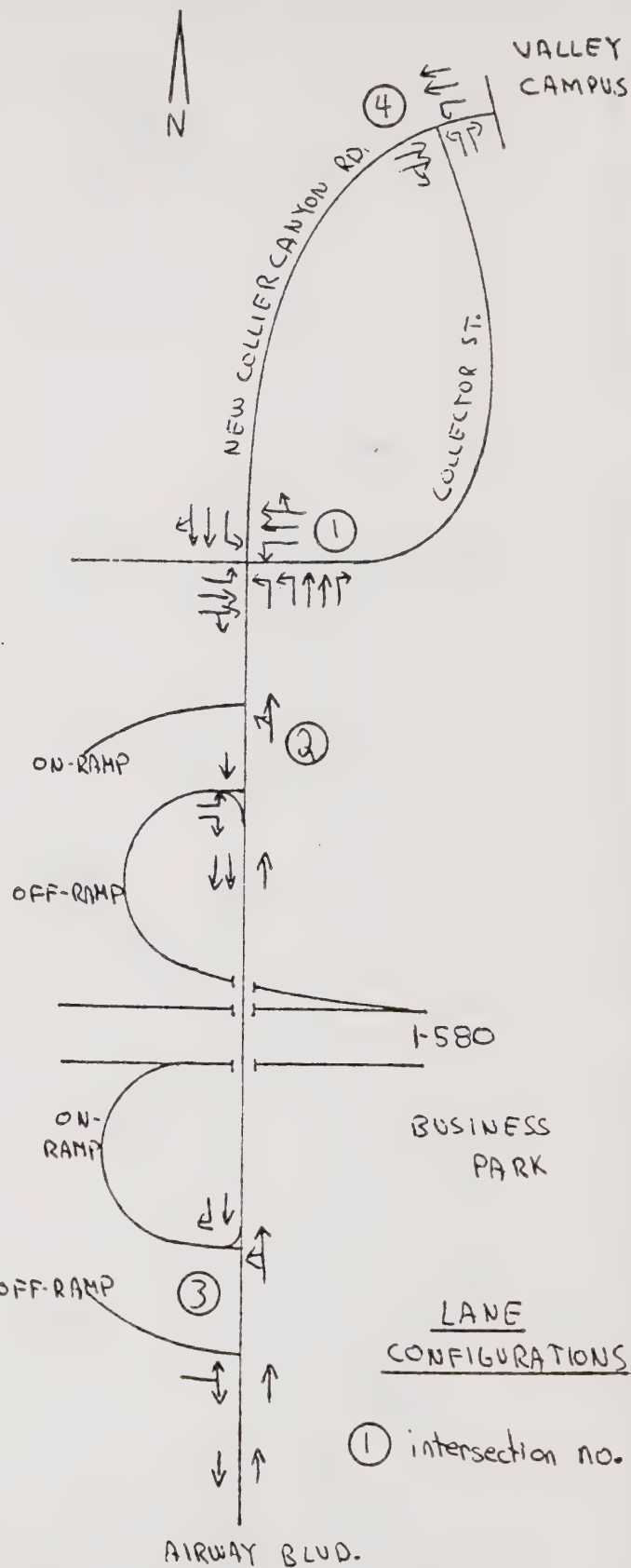
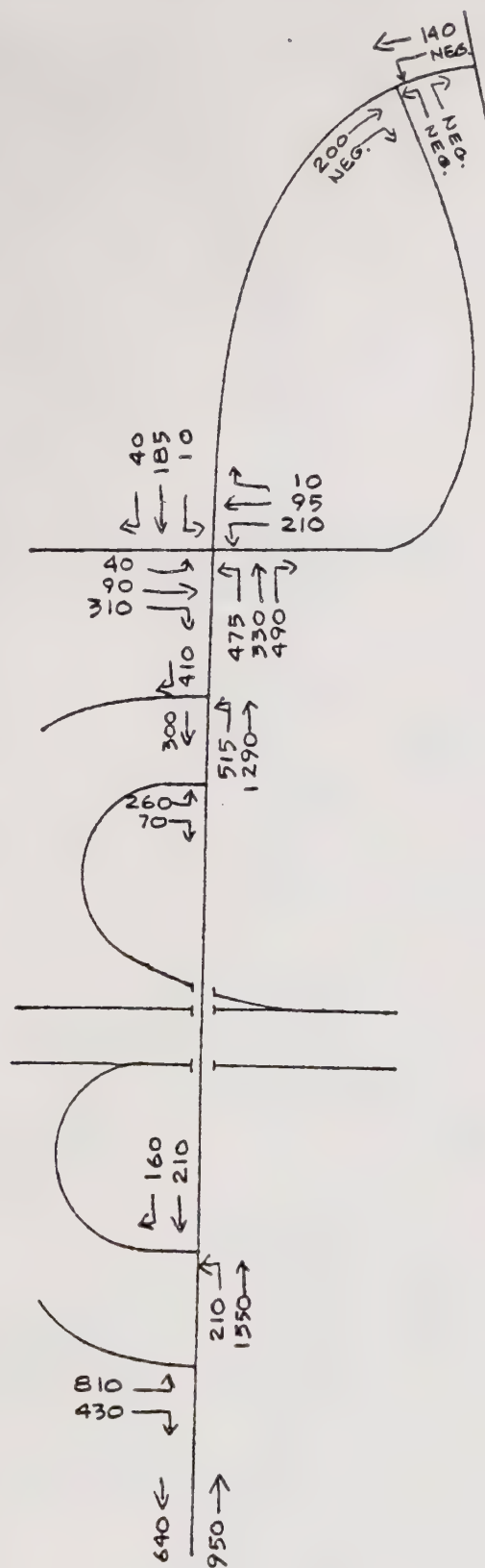
LANE CONFIGURATIONS

① intersection no.

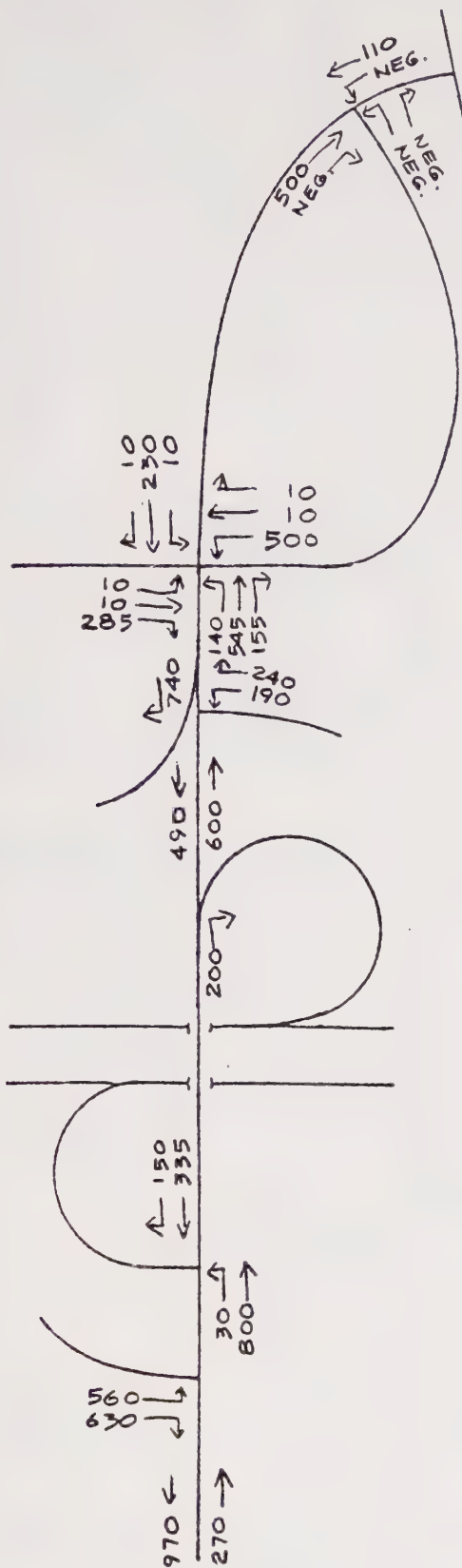
TRAFFIC DIAGRAM 2
1986 TRAFFIC VOLUMES
WITHOUT PROJECT
PM PEAK HOUR



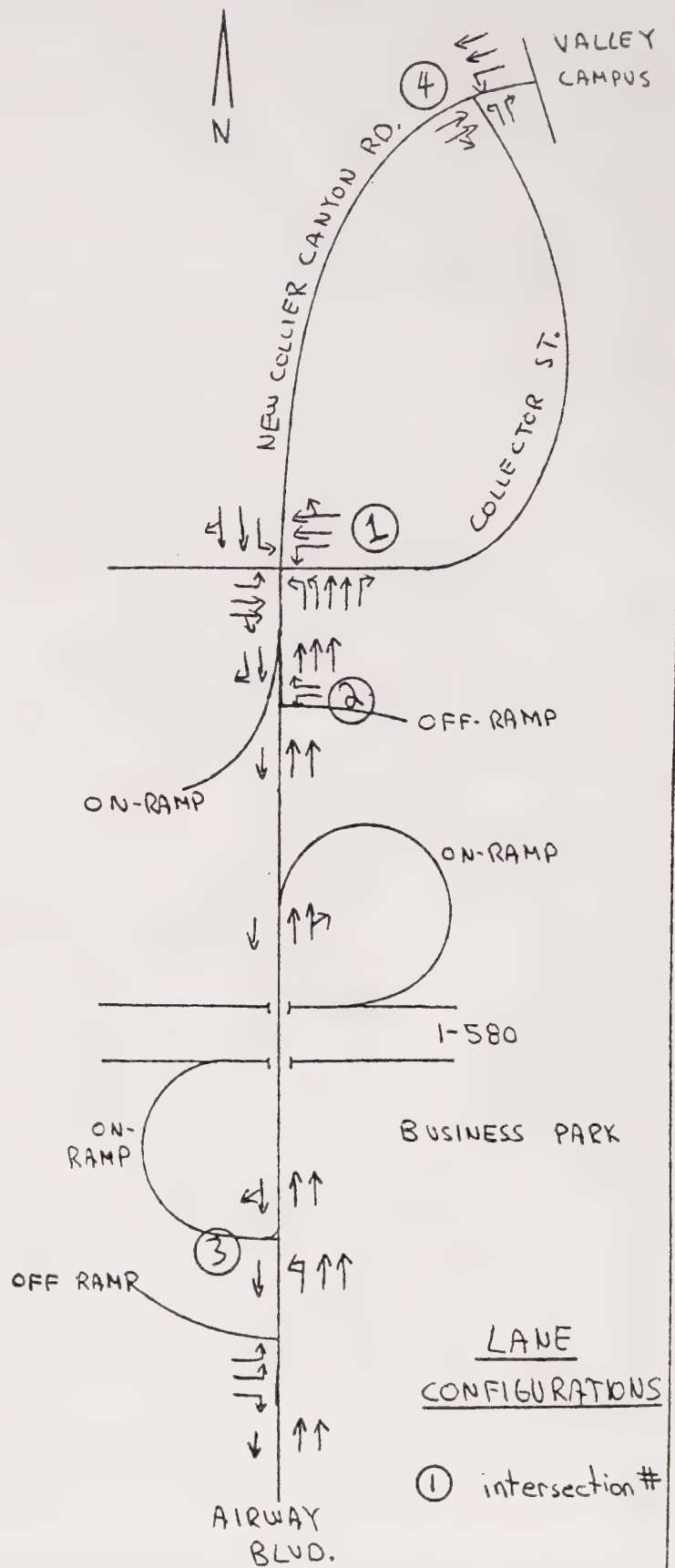
TRAFFIC DIAGRAM 3
1986 TRAFFIC VOLUMES
WITH PROJECT
AM PEAK HOUR



TRAFFIC DIAGRAM 4
1986 TRAFFIC VOLUMES
WITH PROJECT
PM PEAK HOUR



NEG. = NEGLIGIBLE

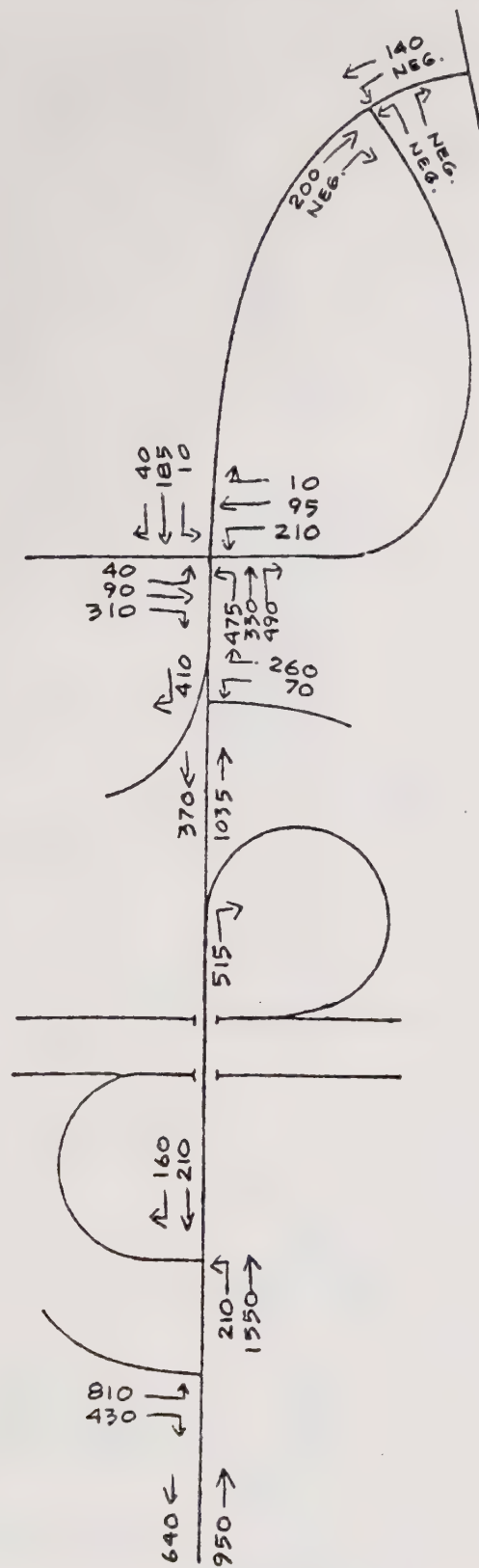


LANE CONFIGURATIONS

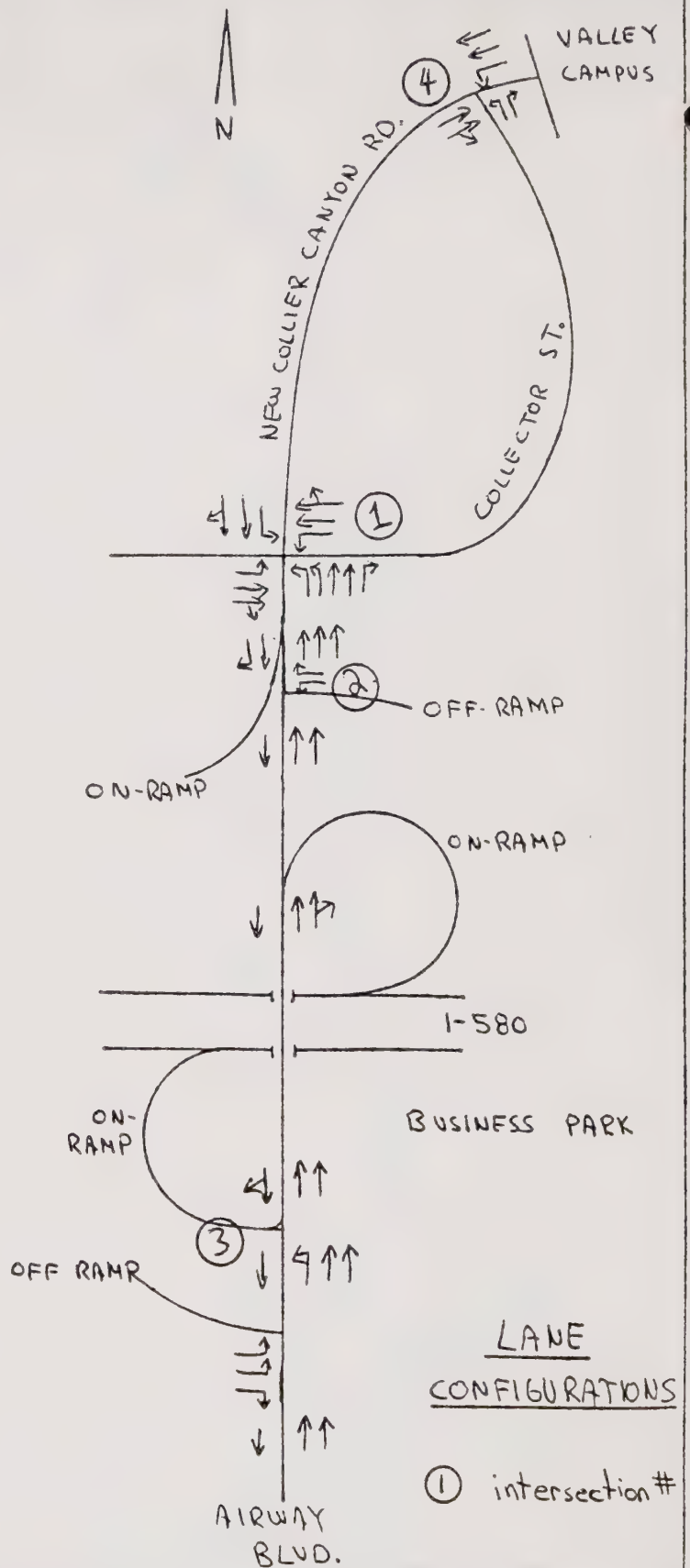
① intersection #

TRAFFIC DIAGRAM 5

1986 TRAFFIC VOLUMES
WITH PROJECT AND
MITIGATION MEASURES
AM PEAK HOUR



NEG. = NEGLIGIBLE

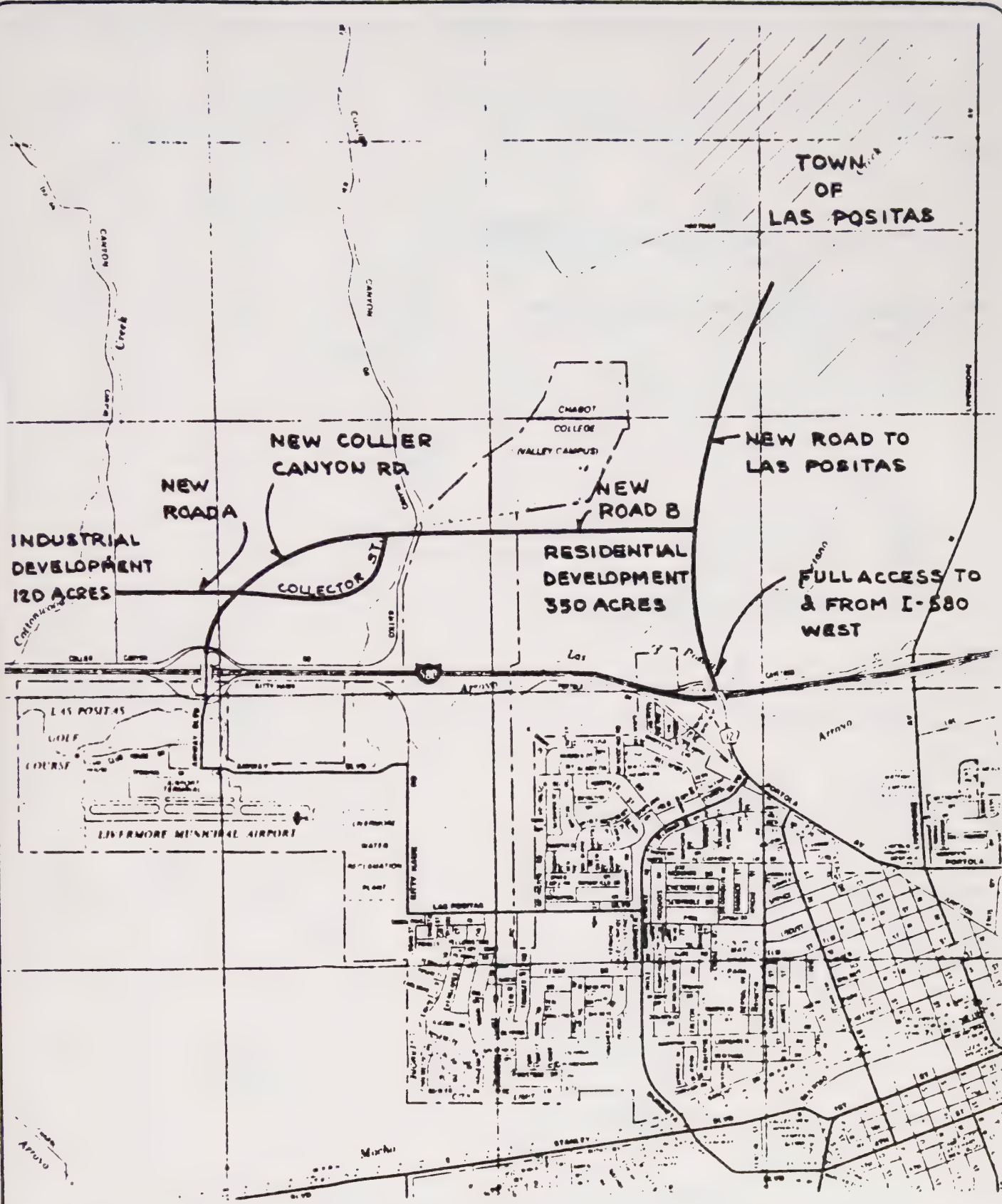


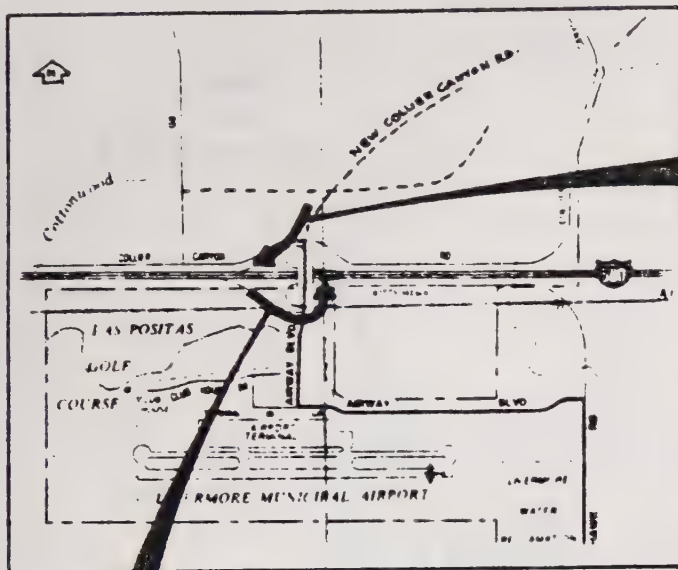
LANE CONFIGURATIONS

① intersection #

TRAFFIC DIAGRAM 6

1986 TRAFFIC VOLUMES
WITH PROJECT AND
MITIGATION MEASURES
PM PEAK HOUR





TRAFFIC	
AM PEAK HOUR	PM PEAK HOUR

LAS POSITAS	1350	2262
RESIDENTIAL DEVELOPMENT	231	549
INDUSTRIAL DEVELOPMENT	183	65
NORTHBLUFF DEVELOPMENT	270	750
1986 TRAFFIC	290	60
TOTAL YEAR 2005 TRAFFIC	2324	3686

CRITICAL PEAK HOUR
AT INTERSECTION OF
I-580 EASTBOUND RAMP
AT AIRWAY BLVD. SEE
FIGURE 9 FOR CAPACITY
CALCULATIONS.

TRAFFIC	
AM PEAK HOUR	PM PEAK HOUR

LAS POSITAS	1695	1484
RESIDENTIAL DEVELOPMENT	449	275
INDUSTRIAL DEVELOPMENT	324	126
NORTHBLUFF DEVELOPMENT	700	360
1986 TRAFFIC	40	50
TOTAL YEAR 2005 TRAFFIC	3208	2295

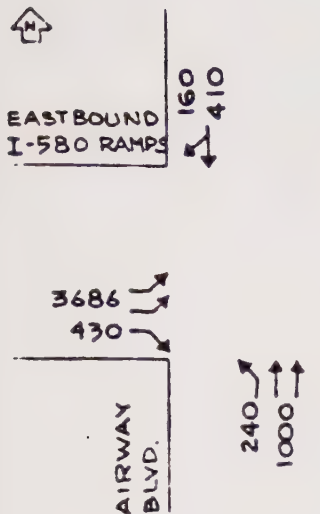
CRITICAL PEAK HOUR
AT INTERSECTION OF
NEW ROAD A AND
NEW COLLIER CANYON
RD. SEE FIGURE 9
FOR CAPACITY
CALCULATIONS

NOTE: THESE TRAFFIC PROJECTIONS HAVE BEEN ASSIGNED ON THE STREET NETWORK SHOWN IN FIGURE 7 WITHOUT THE FULL INTERCHANGE AT PORTOLA AVE AND I-580 AND THE PORTOLA AVE. EXTENSION.

TRAFFIC DIAGRAM 8

CRITICAL PEAK HOUR TRAFFIC
VOLUMES @ AIRWAY BLVD. AND
I-580 INTERCHANGE (YEAR 2005)

CAPACITY ANALYSIS @ I-580 EASTBOUND ON & OFF RAMP @
AIRWAY BLVD. - YEAR 2005, PM PEAK HOUR



- 1) PROPOSED 1986 ROADWAY GEOMETRICS ARE ASSUMED AS SHOWN, ALSO SEE : FIGURE 6.

CRITICAL VOLUME =

$$\frac{3686}{1.8} + \frac{1240}{2} = 2668 \text{ VEH/HR/LANE}$$

CRITICAL CAPACITY FOR A 2 Φ SIGNAL FROM TABLE 6, INTERIM HIGHWAY CAPACITY MANUAL = 1800 VEH/HR/LANE

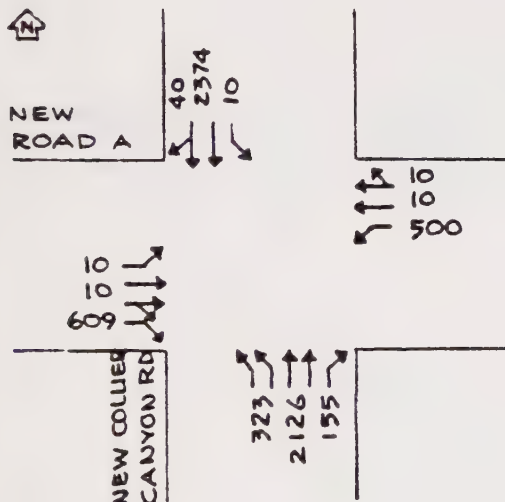
$$V/C = \frac{2668}{1800} = 1.48 \dots \text{NOT ACCEPTABLE}$$

L.O.S = F+

- 2) THEORETICAL ROADWAY GEOMETRICS WHICH WOULD BE NECESSARY TO OBTAIN A L.O.S. OF "C" ARE:

- A) FOUR EASTBOUND LEFT TURN LANES
- B) SIX LANES ON AIRWAY BLVD.

CAPACITY ANALYSIS @ NEW COLLIER CANYON RD. & NEW ROAD A - YEAR 2005, AM PEAK HOUR



- 1) PROPOSED 1986 ROADWAY GEOMETRICS ARE ASSUMED AS SHOWN, ALSO SEE FIGURE 6.

CRITICAL VOLUME =

$$\frac{2414}{2} + \frac{323}{1.8} + 500 + 609 = 2495 \text{ VEH/HR/LANE}$$

CRITICAL CAPACITY FOR 4 Φ PLUS SIGNAL FROM TABLE 6, INTERIM HIGHWAY CAPACITY MANUAL = 1650 VEH/HR/LANE

$$V/C = \frac{2495}{1650} = 1.51 \dots \text{NOT ACCEPTABLE}$$

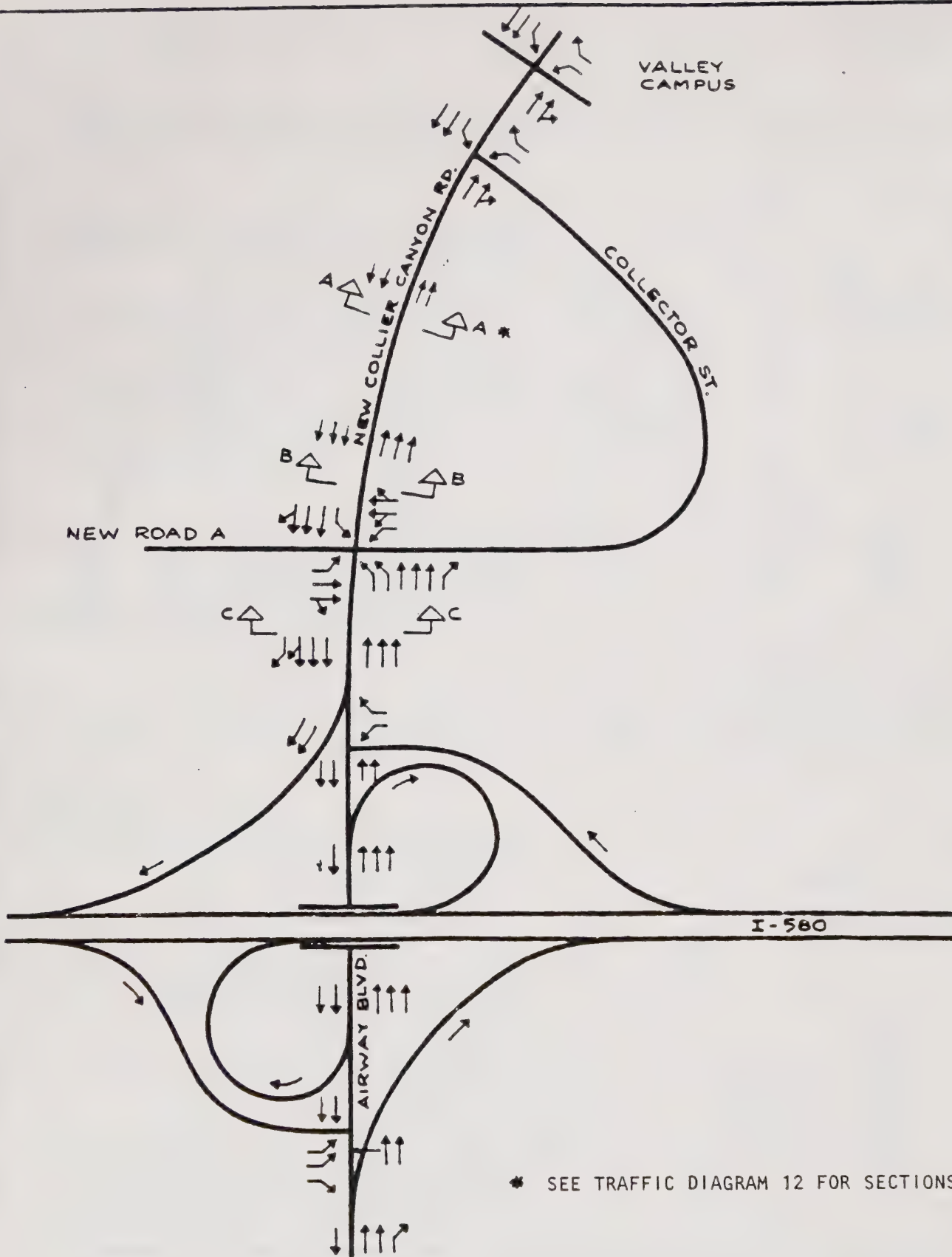
L.O.S = F+

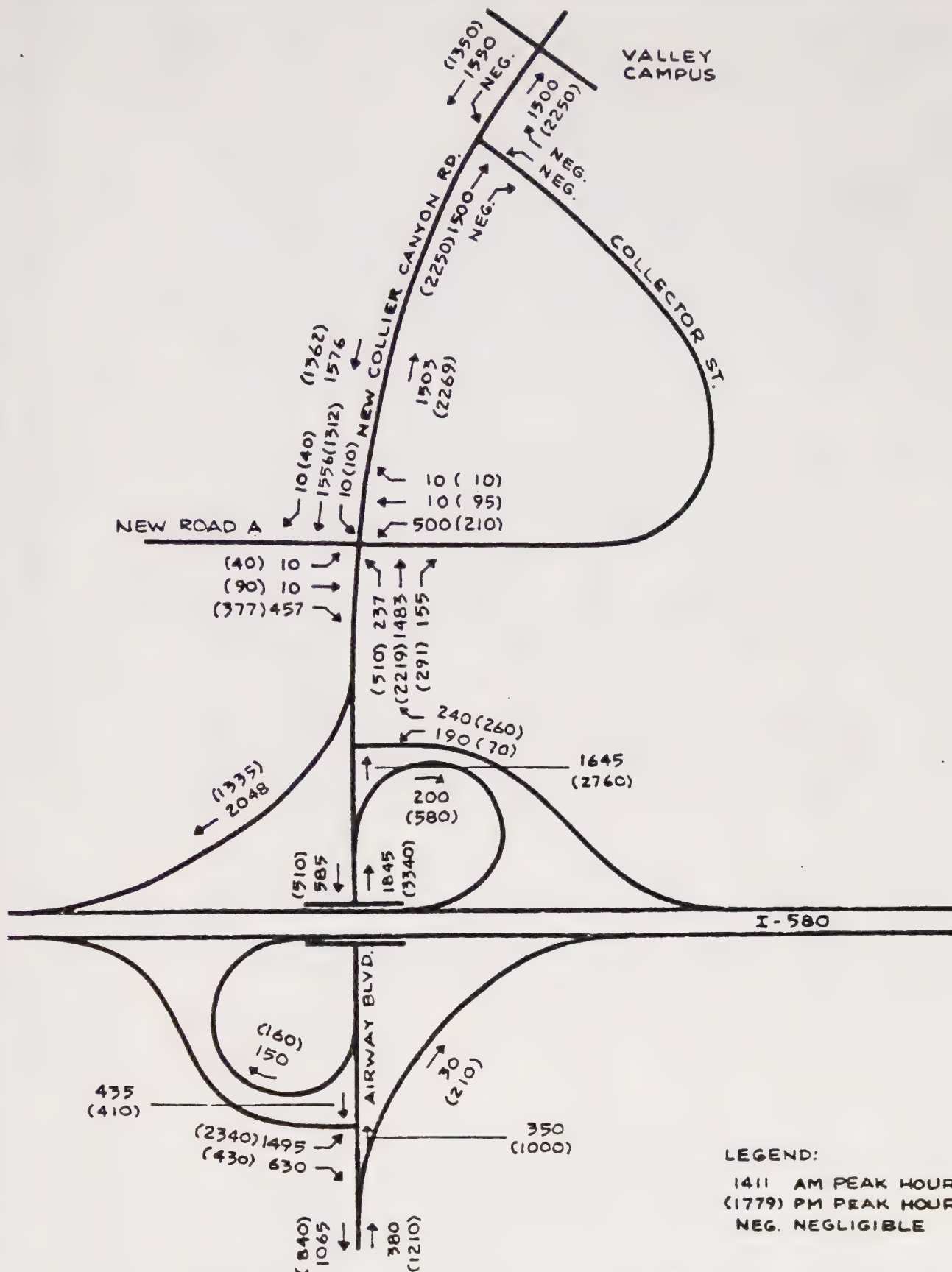
- 2) THEORETICAL ROADWAY GEOMETRICS WHICH WOULD BE NECESSARY TO OBTAIN A L.O.S. OF "C" ARE:

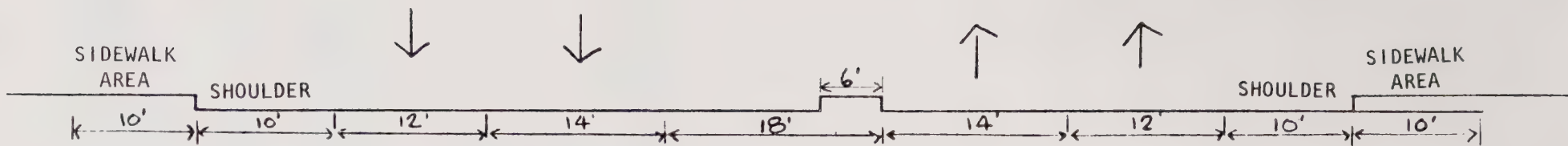
- A) FOUR THROUGH LANES IN EACH DIRECTION ON NEW COLLIER CANYON RD
- B) EASTBOUND DOUBLE RIGHT TURN LANES, WESTBOUND TRIPLE LEFT TURN LANES

TRAFFIC DIAGRAM 9

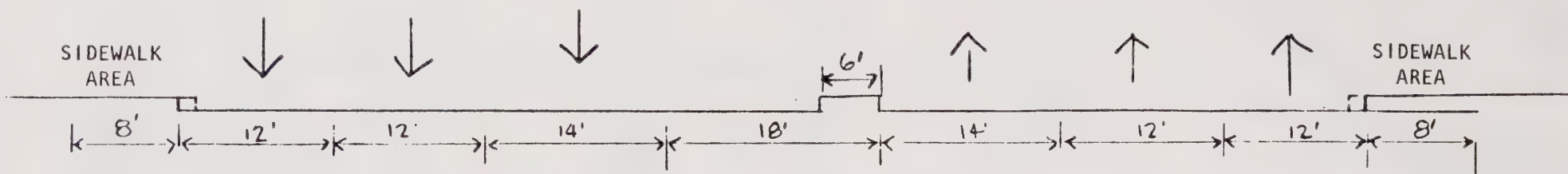
PEAK HOUR TRAFFIC CAPACITY
ANALYSIS AT CRITICAL
INTERSECTIONS - YEAR 2005



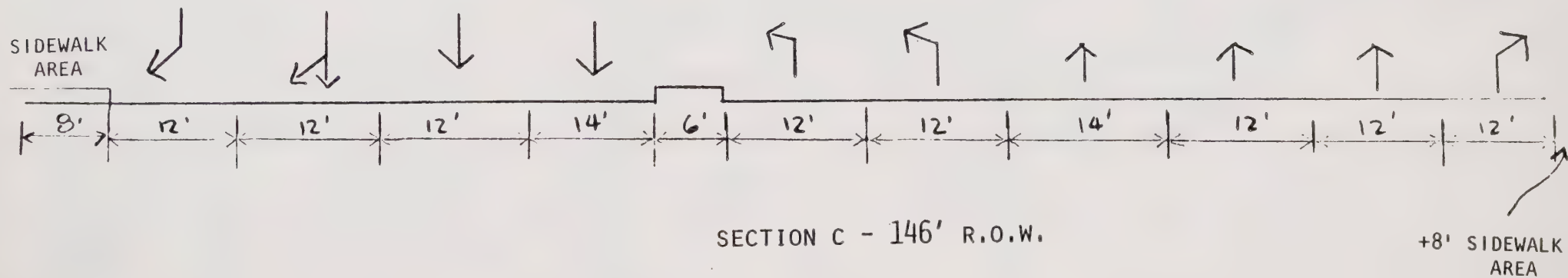




SECTION A - 110' R.O.W.



SECTION B - 110' R.O.W.



SECTION C - 146' R.O.W.

* WIDENS TO 18' AT ROAD A

TRAFFIC DIAGRAM 12 - ROADWAY CROSS SECTIONS
(REFER TO TRAFFIC DIAGRAM 11 FOR LOCATIONS)

Canyon Road (see Traffic Diagrams 10 and 12).

- . Between the mid point and intersection of New Road A and New Collier Canyon Road, a six lane divided arterial will be required to accommodate year 2005 traffic demand as shown on Section B, Traffic Diagram 12. The additional lanes can be accommodated within the 110 foot right-of-way by converting the shoulder to a travel lane. Approaching the New Road A intersection, the 110 feet right-of-way should gradually widen to match the 146 foot right-of-way required south of New Road A (Section C - Traffic Diagram 12).
- . New Road A should be a four lane divided arterial between New Collier Canyon Road and Doolan Canyon Road (Section A - Traffic Diagram 12). Ultimately, Road A should be extended westward to Fallon Road to access onto I-580 and abandon the partially completed frontage road north of freeway.
- . East of New Collier Canyon Road, the proposed Collector Street should also be a four lane divided arterial for several hundred feet. East of this point, the road can transition to a typical collector street right-of-way.
- . The existing three lane bridge will need to be widened over I-580 Airway Boulevard to provide two southbound and three northbound lanes. In addition, a new eastbound on-ramp would replace the left turn to the existing loop on-ramp.
- . Based on available traffic projections it appears that I-580 east of Airway Boulevard will operate at level of service D-E (unstable operation) during the peak hours.
- . A new interchange will be required to accommodate future traffic by the proposed new town Las Positas.

3. Service and Utilities

a. Water

1) Setting

Currently no public agency provides domestic water service to the site. Water is wholesaled in the Livermore-Amador Valley by Zone 7. Retailers in the vicinity are California Water Service Company (supplying about 85 percent of Livermore) and the City of Livermore. Nearest retailer is CWSC. A 36" main with treated water at 100 pounds pressure parallels I-580 south of the freeway.

2) Impacts

To provide water to the site, the developer would have to install a water line under the freeway, a storage tank on the hill above the project, and a pumping station to lift water from the existing main to the storage reservoir. Work within the freeway right-of-way must be coordinated with Caltrans.

A number of alternatives exist for operation of the water system. The California Water Service Company could annex the site, extend its mains, and serve the project subject to rules and regulations governing extension of service. Extension of the Company's service area would require approval of the State Public Utilities Commission. Alternatively, administration could be by the proposed Northbluff County Service Area, with actual operation by the County or a hired private firm. It would also be possible for Zone 7 to directly manage the system; although the Zone has heretofore been solely a wholesale water supplier, there is nothing which restricts them from retailing. Neither the Zone nor the County may wish to engage for the first time in metering, billing, and other aspects of operation of a municipal water system.

All capital costs of building the water system would be paid by the project developer. On-going maintenance and operation costs would be paid for by use fees from future project residents. Inefficiencies would result if water service is provided without regard to adjacent properties.

3) Mitigation

If the project is approved, adjacent lands should be examined for potential water service.

b. Sewage Disposal

1) Setting

Currently there is no public agency to provide sewage transmission, treatment, and disposal service to the site. Excess capacity in regional sewage force mains and outflow lines is not available. The City of Livermore adjoins the site on the east and south. The City is amenable to annexing the site but would not, under its General Plan, extend sewer service for residential development for 15-20 years. The City has neither treatment nor disposal capacity sufficient to serve the site in addition to areas previously committed.

2) Impacts

In order to provide sewage treatment service to the site, a wastewater treatment facility will have to be built, a disposal area provided, and an agency created which could finance, own, and operate the facilities. The treatment system will have to be approved by Regional Water Quality Control Board and Zone 7 as well as the County.

An evapotranspiration system is proposed. A conventional extended aeration plant would be constructed in the southwestern corner of the site, capable of treating 400,000 gallons per day. The disposal system will consist of an effluent transmission pipeline, an effluent transmission pump station, a seasonal storage reservoir, a distribution pump station, and an effluent distribution system. Refer to Figure 26 for flow diagram for the overall system; Figure 27 for a tentative plan of the treatment plant; and Figure 28 for a map of the effluent disposal system.

Proposed facilities would include the following:

Preliminary Treatment

- . Parshall Flume
- . Comminutor
- . Grit Chamber
- . Influent Pump Station

Extended Aeration (Oxidation Ditch)

- . 400,000 gallon volume (24-hour detention).
- . 2 rotors - each capable of the required oxygen transfer.

Clarifiers

- . 2 clarifiers - each capable of treating the entire flow.

Flow Equalization

- . Equalize flow to tertiary portion of plant.

Filtration

- . Multiple unit filtration for stand-by capacity
- . Chemical addition of alum and polymer with stand-by unit
- . Flocculator mixer

Reverse Osmosis

- . RO Permeate production of 230,000 gallons per day
- . Brine generation of 40,000 gpd
- . Multiple RO units to provide for flexibility
- . Brine export out of the Valley (trucked)

Sludge Handling

- . Sludge holding tank
- . Dissolved air flotation thickener
- . Belt filter press

Chlorination

- . Chlorine contact time of 2 hours
- . Multiple chlorinators, alarms, switching equipment, etc.

Standby Power

- . 400 kw Diesel generator

Proposed facilities would be similar to systems currently in operation at the Ramona Municipal Water District for the San Diego County Estates, the El Dorado Irrigation District at Kirkwood Meadows, and those in design for Otay Municipal Water District. For further details concerning the proposed system, such as design bases and individual component capacities, the "Wastewater Management Plan for Proposed Northbluff Development," Lowry Associates, 25954 Eden Landing Road, Suite 109, Hayward, CA 94545, should be consulted. The report is available at the Planning Department office in Hayward and is hereby incorporated by reference in this EIR.

Currently Zone 7 is preparing a groundwater management plan which will address (among other issues) wastewater effluent land application impacts. The study is expected to lead to a policy by Zone 7 regarding allowable salt loadings within the Livermore-Amador Valley and surrounding areas. The Regional Water Quality Control Board is expected to use this information for evaluation of Basin Plan amendments scheduled within six months. Preliminary policies have been advanced in the course of the study so far which all would tend to require effluent to be of quality which would require demineralization to achieve something on the order of 250 mg/l TDS maximum. As a result, a reverse osmosis demineralization system is being proposed by the applicants for Northbluff. The system would blend about 2/3 demineralized water with 1/3 filtered water. The RO system would be designed to remove an increase of 300 mg/l TDS projected to be picked up from domestic sewage generation. Using an assumed median value for combined Patterson Pass/Del Valle Water of 220 mg/l TDS, influent would arrive at the Northbluff plant at about 520 mg/l TDS. Removal of 300 mg/l would again generate water with a TDS of 220 mg/l. If domestic potable water were to contain 500 mg/l of TDS, then resulting influent to the plant would be 800 mg/l TDS. At this water quality, the reverse osmosis plant would remove about 480 mg/l of TDS, or greater than the amount contributed by domestic sewage generation. Mass discharges over annual or quarterly periods are proposed so that variation in potable water quality would allow flexibility in operation by starting or dropping off multiple demineralization units as needed to meet salt discharge limitations. Demineralization facilities would be designed for additional future units should discharge requirements become more stringent. The concept is that application of demineralized affluent would not provide salt loading greater than would irrigation use of potable water supplies. Project proponents thus believe that the system should be approved in advance of a basin-wide plan since water quality objectives as stringent as any likely to be adopted would be met.

A pumping station at the treatment plant would pump treated effluent through a pipeline to an effluent distribution station at about the 700' elevation level in the upper portion of the site. A seasonal storage reservoir would be constructed to contain about 36 days of produced wastewater (45 acre-feet, depth of 15') to accommodate rainy periods when spray disposal operations are not possible. It would also serve as an operational storage reservoir from which the wastewater would be

distributed to the disposal area. Lining would be earthen using native materials to seal the bottom and side slopes to limit percolation. Excess runoff would be diverted around the reservoir. A pump station would be constructed at the reservoir to pressurize the distribution system. An extensive distribution system would be required, separated into individual plot areas to allow proper application rates and rotation programs. Management of the disposal area would be a critical part of the proper operation of the total wastewater system. Application rates must be compared to maximum percolation rates in the soils and minimum infiltration and permeability into the underlying bedrock. Application of wastewater must be rotated to allow time for the crop to use the applied water and to prevent runoff. Upon calculating the safe application rates, it was determined that the upland site area is not sufficient to take up the available effluent. Applicants have secured an option on the 100-acre neighboring Grimshaw property, shown on Figure 28, to utilize as a spray disposal area. A 300' buffer zone is proposed between the spray area and developed areas. Crop planting and harvesting would have to be managed in such a way as to eliminate build-up of nitrates from nitrogen in the soil. It is estimated that 15 mg/l of nitrates as nitrogen would result in approximately 50 pounds of nitrogen per day from the wastewater. Using a disposal area of 150 acres, the nitrogen loading rate would be approximately 120 pounds/acre/year. Numerous grasses can be planted with greater nitrogen uptakes. A monitoring program would be required to detect any problems resulting from wastewater application. The hillsides should be checked for formation of springs or seeps. If they should form, additional vegetation could be planted to increase evapotranspiration, or small check dams could be constructed to collect the flow and pump it back to the disposal area.

Groundwater monitoring would also be necessary, possibly utilizing existing wells modified for the purpose. Since the proposed disposal area is located beyond the groundwater basin boundaries for the Santa Rita and Livermore City sub-basins, groundwater quality monitoring should be performed along the boundary of those sub-basins.

Annual operation and maintenance cost of the entire system is estimated to be \$614,500/year, or \$358 per dwelling unit per year.

It is proposed that a County Service Area be set up for the Northbluff project. The CSA would provide sewer

service; that is, it would:

- . operate and maintain the collection and disposal system;
- . review and manage the cost and fee structure, set service standards, establish an annual budget, collect fees;
- . charge special assessment or fees to users if necessary;
- . be responsible for maintaining water quality standards of Regional Water Quality Control Board, County Health Department, and Zone 7.

The CSA would be run by the County Board of Supervisors. Actual operation of the system probably would be by the County Public Works Department, under existing County policy. The Public Works Department would be funded through contract to the CSA. Treatment facilities would have to be in place prior to any occupancy of units. A fee structure would have to be established to ensure operation of the plant during the buildout period. A two-tier system could be set up whereby unoccupied building sites would pay an availability charge for operation and maintenance of the system, while occupied sites would pay a user fee that reflects the operation and maintenance of processing their sewage flow. The user fee would be higher than the availability charge. Such a fee structure would have to be set up under the Planned Development zoning based on 1,750 dwelling units, rather than through subdivision tract procedures, since tract maps will probably not be approved for the whole project at once.

Project applicants have attempted to meet all environmental considerations in designing the overall sewage treatment system. If every component works as planned, water quality impacts would be insignificant. Impacts could occur, however, if unanticipated problems develop. The technology proposed has not been developed with certainty. The major foreseeable environmental impact is increased energy consumption because of energy intensiveness of demineralization and the amount of pumping which would be required. Consumption is estimated at about 2 million kilowatt-hours per year.

The treatment plant is proposed to be located within 300' of future residences and 600' from an existing residence. Odors from the plant would be a significant

nuisance to nearby residents.

Management and operation of the system by the County would require new staff. Costs would presumably be fully borne by the project but start-up would require considerable planning of timing of hiring, project planning, etc. A new agency would be introduced into the Valley responsible for water management with no mechanism for coordination with other water management agencies. Problems of continuity could develop if Livermore were to annex the site. It would be inefficient overall for the County to provide sewer service for a site adjacent to Livermore, an inefficiency which will be reflected in higher than normal sewer service charges for future project residents. Inefficiency may be compounded if nearby properties are not included in facility planning. The County, as operator of the system, would accept an unknown amount of risk by being responsible for water quality maintenance. Project residents may be expected to protest if future costs to maintain acceptable water quality increase. Implications for the County are especially significant because if the project is approved, the method of assigning sewage disposal responsibilities would likely serve as a precedent for other projects utilizing discrete systems.

3) Mitigation

While considerable backup facilities have been included in the treatment system proposal, additional contingency plans should be developed which would ensure the system's integrity (or at least prevent health, safety, and water quality problems) under reasonably foreseeable outages, failures, disasters, etc.

More detail concerning crop management in the spray disposal area needs to be provided to ensure ongoing nitrate removal. The proposal to have the disposal area owned by the CSA and leased for grazing may not be feasible once cost details and crop restrictions are known. It would be preferable to have the entire sewage system, from collection to treatment to disposal, under unified management because of the inter-relatedness of system components and the degree of sophistication in operation required. Consideration should be given to awaiting Zone 7's Wastewater Management Study results before commitment to any specific management arrangement so that alternatives to be explored by the study are not curtailed by precedential action on this particular application. The study will examine the overall problem of sewage disposal for the Valley so that any cumulative impacts will

be taken into account. It would also be worthwhile to examine implications of involving the County Public Works Agency in management of this system, and other potential systems in the Valley, including relationships with other water management agencies.

If the project is approved, adjacent properties should be examined for potential sewer service and inclusion in the CSA.

If at all feasible, the treatment plant should be located farther from the existing and proposed residences. Plant operators (=the County) can otherwise expect complaints about odors. The site proposed is advantageous because it is at the low drainage point of the property, allowing the use of gravity sewers and avoiding the additional expense and maintenance problems of pumping raw sewage. Also, emergency connection to the existing Livermore plant would be easiest at this location. However, alternatives do exist, including placement off-site near the disposal area, which should be re-evaluated by the wastewater management consultants prior to a final decision.

c. Schools

1) Setting

The site is within the boundaries of the Livermore Unified School District. The District does not provide busing service. No elementary school is near to the site. The nearest Grade 9-12 facility is Granada High School at 400 Wall Street in Livermore, about four miles from the site. Granada High School is currently overcrowded.

2) Impacts

Based on student generation factors of 0.3/dwelling unit for K-6, 0.15/dwelling unit for 7-8, and 0.2/dwelling unit for 9-12, the project is estimated to generate the following number of children (Livermore Valley Unified School District, 1981):

K-6	=	0.3	x 1750	=	525 total, or 88 per year
7-8	=	0.15	x 1750	=	263 total, or 44 per year
9-12	=	0.2	x 1750	=	350 total, or 58 per year

The developer intends to construct an elementary school in the location shown on the site plans and dedicate it at no cost to the Livermore Unified School District. If the District constructs the school, a per unit fee of \$858 would need to be imposed, based on a school cost of \$1,500,000. An 8-acre site is indicated, which is adequate, but the location is somewhat on the periphery of the population to be served. The plans do not indicate whether recreational facilities will be provided on the school grounds. The school would probably not open until a substantial number of children (150-200) live in the project. K-8 children would have to be accommodated in existing schools until the on-site school opens. Since no school bus transportation is provided, parents would be responsible for transportation of their children to school. The nearest elementary school is Portola on Portola Avenue in Livermore; the nearest intermediate school is Junction on Junction Avenue. Both are about four miles from the site. Transportation of children to school by parents would involve a significant number of trips, especially contributing to traffic during morning peak hours, and would generate an unusually high amount of vehicle miles traveled for the purpose because of the distance to schools. The impact would be temporary, lasting until the school on site is opened.

Construction of a new school on the site at the same time the School District is faced with closing schools located closer to central Livermore would be an inefficient use of resources.

Granada High School could accommodate students from the project with the addition of relocatable classrooms. Development within the City of Livermore currently pays \$570 per unit to the School District through an agreement between the District and the City. It is expected that a similar arrangement would be made through the County for the project. This fee would pay for the additional classrooms at the high school.

3) Mitigation

Mitigation for direct impacts upon the School District is being proposed as part of the project. Consideration should be given toward locating the school more centrally and providing recreation facilities at the school. Trips to existing schools could be greatly reduced if the developer were to provide bus service. Service would be relatively easy to provide between the compact

initial stage areas of the project and the elementary/intermediate schools in Livermore.

d. Police Protection

1) Setting

The Alameda County Sheriff's Department currently provides service for the site in criminal matters and the California Highway Patrol provides traffic control services.

The County Sheriff provides a full range of services related to crime control on an as-needed basis. The Sheriff currently has three patrols for an unincorporated population of 35,000 (one officer for every 2,400 citizens) and responds to calls and specific complaints, but is not adequately staffed at this time to patrol individual neighborhoods. The Sheriff services the unincorporated area around Livermore from the Santa Rita field office, about four miles to the west of the site.

The California Highway Patrol (CHP) provides traffic service for the unincorporated areas of Alameda County. Currently the CHP has four to six patrol units patrolling approximately 40 miles of the Interstate 580 freeway, and a Special Enforcement Unit which concentrates on traffic trouble spots throughout southern Alameda County's unincorporated areas. The CHP manpower in the south county area (as well as the entire state) has been declining in the last five years although the area has continued to develop. The CHP's primary responsibility is to patrol the freeway with secondary responsibility for traffic accident calls in the unincorporated area. Routine patrol is provided on demand by the Special Enforcement Unit. However, the Unit serves the entire South County unincorporated area and is thus available on a limited basis.

Under existing mutual aid arrangements, Livermore Police Department backs up the County Sheriff's Department during emergencies. Currently, the City provides more service to the County than vice versa under this management.

2) Impacts

It is unlikely that the CHP would increase its patrol capacity with the addition of the project. Rather, its existing capacity would be extended to include the

development, resulting in a slight thinning of service levels.

The County Sheriff's Department would need to add a full-time patrol to serve the project as it reaches build-out. A full-time patrol consists of adding 4.5 personnel plus equipment and support. Cost details are given in the Fiscal Impacts section. The project would probably worsen the existing imbalance in the amount of mutual aid given the County by the City of Livermore.

e. Fire Protection

1) Setting

Fire service for the unincorporated area surrounding Livermore is provided by the Alameda County Fire Patrol. The closest station is located in Livermore at P Street and College Avenue, with a response time of 8 minutes to the site. The station provides both brush and structural fire protection with structural fire equipment consisting of a 1,000 gallon pumper. Four full-time firemen are on duty 24 hours per day

The City of Livermore has a fire station within 7 minutes of the site. This station could provide back up protection if the project had an adequate level of primary fire protection. A mutual aid agreement under which the City would provide first response to the project would be disadvantageous for the City to negotiate, and the City has indicated an unwillingness to consider such a proposal. The existing level of fire protection is not adequate to serve the project.

2) Impacts

Applicants propose to construct and equip a fire station on site, at their expense, with annual operating costs beyond those paid through property taxes from the project to be paid by the proposed Northbluff County Service Area. The station would be equipped with one 1,000 gallons per minute pumper and 500 gallon storage capacity. A 3-man engine company would provide staffing (3 men on duty 24 hours per day, 7 days per week). It is expected that this level of protection would be sufficient to assure a fire insurance rating by the Insurance Services Office of 6, or less, which would permit residents to purchase insurance at rates typical for well protected urban areas. The 1,000 gallon pumper would be acquired in the first year of the build-out period and temporarily housed at the County Fire Patrol station located 8 minutes away.

The fire station would be built and the 3-man company provided beginning in the third year, assuming phasing proceeds on schedule. Fire service would thus be marginal for the first phases of development. The below-par service could last for years, depending on actual build-out rate (it has been the County's experience that build-out for large projects tends to occur much slower than originally estimated).

Operating costs of the on-site fire station, once constructed, would be paid through the CSA under a special tax or standby charge which would meet the difference between the operating cost of the station and the property taxes generated for fire protection in the project. The tax would be paid by the owner of each parcel, whether developed or not, on the basis of dwelling unit equivalents (DUE). Commercial property is counted at 1300 sq. ft./DUE. Refer to the Fiscal Impacts section of this EIR for details concerning financing of fire protection services for the project.

Providing a fire station to serve the project is relatively inefficient because of the small number of structures to be served. The inefficiency is reflected in the magnitude of the shortfall between predicted property tax revenues and expenses for fire protection for the project.

No location for the fire station has been designated on submitted plans.

3) Mitigation

Sub-par fire protection for the first phases of the project can only be mitigated if the on-site station is constructed prior to protection needs. Protection is required from the time wood framing occurs during the construction period. A mutual aid agreement could be negotiated with the City of Livermore and the County Fire Patrol to enhance protection during these early phases, but long response times from the existing stations would still be a problem.

Inefficiency of having a fire station just to serve the project is unmitigable due to the location and size of the project. If approved, the Planned Development maps should indicate the location of the fire station, which should be planned with the help of area fire protection districts.

f. Recreation

1) Setting

The site is located within the Livermore Area Recreation and Park District (LARPD). This independent district has been in existence since 1947 and serves 240 square miles and 55,000 people. Closest recreation facilities to the site are neighborhood parks in the City of Livermore. The District has relied on user fees to support the majority of its activity programs since Proposition 13. Property tax revenues of the District are used primarily for park maintenance, management, and operations.

2) Impacts

Project residents will increase demand for park and recreation facilities. Project plans show two public parks totaling 9.6 acres. One park, apparently intended primarily for passive recreation, is shown adjacent to the proposed school site in the eastern portion of the project. The larger of the two parks is shown at the intersection of new Collier Canyon Road and the major loop collector road, just north of the Freeway Interchange. This park would have more active recreational facilities, such as playing fields. A private recreation center area of 1.7 acres is shown just to the north. Applicants also propose private recreational facilities in town house and condominium areas. About 17 acres of parks are required to be dedicated to LARPD under the Alameda County Subdivision Ordinance; however, some of this requirement can be satisfied by fees (covering the costs of improving the parks) paid in lieu of dedication. The Park District does not have funding available for capital improvements. The developer would thus be required to dedicate fully improved parks at no cost to the District. Operating and maintenance expenses would be assumed by the District. Refer to the Fiscal Impacts section for details. It is conceivable that reimbursement for some portion of improvement costs could be negotiated with the Park District based on high projected tax revenues to be received by the District at project build-out.

3) Mitigation

More detail is needed as to park site improvements and the developer's intentions for town house/condominium recreation facilities.

Major park facilities are shown in the first phase of development, so that timing of their availability to future residents should not be a problem.

g. Solid Waste

1) Setting

Garbage collection in the Livermore area is provided by Oakland Scavenger Company.

2) Impacts

Northbluff could be serviced by Oakland Scavenger Company by means of a franchise agreement with the County or the Northbluff CSA. Solid waste generated by the project would incrementally fill the Altamont sanitary landfill at a faster rate, although this is not significant, because of the vast disposal capacity of the Altamont site.

h. Library

1) Setting

The Alameda County Library has branches in Dublin and Pleasanton. The closest library is in Livermore, which has its own library system. The County operates book-mobile service in areas of sufficient demand.

2) Impacts

Existing County Library facilities will be adequate to serve the project. However, project residents may also use City of Livermore Library facilities, with no revenue accruing to the City from the project. The nearest County Library branch, in Dublin, is 7 miles from the site; Livermore Library is 4 miles away.

3) Mitigation

No mitigation measures are apparent.

i. Electricity, Gas, Telephone

1) Setting

Electricity and gas service is provided by Pacific Gas & Electric; Pacific Telephone provides that service. An electric line exists up Collier Canyon Road serving Chabot College. Only distribution telephone lines exist in the vicinity.

2) Impacts

Capacity of telephone lines would have to be increased from the site back to Pacific Telephone's central office in Livermore. Existing electric lines would also have to provide greater capacity. A gas transmission line would have to be constructed from the Airway Boulevard area northerly under I-580 to serve the site. P. G. and E. would have to secure a permit from Caltrans for work within the freeway right-of-way. No significant off-site impacts are foreseen by the utilities. On-site impacts would be dwarfed by impacts of overall project construction.

4. Visual and Aesthetic Qualities

a. Setting

The site is readily visible from (it's adjacent to) I-580, a Scenic Route designated in the Alameda County General Plan and implementing Specific Plan for Areas of Environmental Significance. A Scenic Route Corridor extending 1,000' north of the freeway has been adopted by the County in which development is to be regulated to protect views of the hills.

The site appears typical of scenery to the north of I-580 in this portion of the Livermore Valley. It is largely grassland, portions grazed, green in wintertime with fresh growth of annual grasses, turning brown-yellow in summer. The southerly half of the site appears gently sloping; to the north, rolling hills rise abruptly from the flat portion. A small group of introduced trees is located north of the Collier Canyon Road freeway interchange. A line of eucalyptus trees runs north-south in the middle of the site.

b. Impacts

Construction of the project would transform the southerly portion of the site from a rural to an urban environment. The present pastoral nature of the view from the freeway would be changed to views of suburban land uses, similar to existing views of Dublin. Past development north of the freeway in the Livermore area, including the Springtown neighborhood and Chabot College Valley Campus, tends to reduce significance of interruption of the rural open space which would result from the project. The impact would be most heavy upon existing nearby residents.

Although most of the northerly hilly area of the site is proposed to be left undeveloped, some encroachment into the base of the hills is shown. Mass grading is proposed to create flat pads for homes and to create tiers of lots in an apparent attempt to maximize views. The northerly tier of pads would require up to

50' cuts into the hillside, which would be visible from the freeway until screening vegetation matures, and detrimental to the hillside aesthetics. A total of 1,151,000 cubic yards of earth would be moved to accommodate the project, an average of 658 cubic yards per unit. Although the overall average per unit is relatively low, much of the grading would be needed for the upper detached lots.

c. Mitigation

Mitigation of grading impacts can be accomplished by reducing the amount of cut and fill proposed through conforming the development better to existing topography. In the uppermost areas of the site, the highest tier of lots could step up the hill more steeply, so that cut into the hill could be reduced. The grading plan exhibits other potential areas for mitigation, which should be accomplished prior to filing tentative subdivision maps. To so ensure, provisions of the Planned Development should require reduction of grading.

Considerable landscaping is proposed as part of the project to mitigate visual impacts. A landscape buffer is shown between the freeway and developed areas. The bluff areas would be planted with native grasses, wildflowers, and trees. A detailed landscape plan should be required through the PD to be submitted at the time of filing tentative subdivision maps, with landscaping used to soften visible graded areas. Landscaping is also shown on submitted plans in open space areas, including trail system corridors. In order to create an aesthetically pleasing community environment, Site Development Review (a County design review process) should be required of all plans for commercial, town house and condominium areas.

5. Noise

a. Setting

The primary noise generator affecting the site is I-580, an eight-lane freeway. Noise contours mapped by California Department of Transportation (Caltrans) in 1973 indicate that the the 65 L₁₀dBA line extends about 330' north of the northerly edge of the freeway; the predicted 1995 contour would extend about 500' northerly onto the site. The 1973 70 L₁₀dBA contour extends 650' north of the freeway edge; projected to extend 950' northerly of the freeway in 1995. (L₁₀dBA is a noise level, adjusted for human ear's sensitivity to the various noise frequencies, which is exceeded 10% of the time). A more commonly used measurement is L_{dn}, which represents an average equivalent noise level during a 24-hour day, with a 10 decibel penalty added to noise occurring between 10:00 p.m. and 7:00 a.m.. It is similar to CNEL. To convert L₁₀dBA to L_{dn} for busy highways (ADT greater than 30,000), 3 dB may be subtracted, based on empirical studies. (California Office of Noise Control, 1976). Applying this correction factor

and interpolating among noise contours on the Caltrans maps, the following figures are obtained:

1973 70 L_{dn} - 230' north of northerly freeway right-of-way

1995 70 L_{dn} - 330' north of northerly freeway right-of-way

1973 65 L_{dn} - 450' north of northerly freeway right-of-way

1995 65 L_{dn} - 650' north of northerly freeway right-of-way

The other noise generator currently affecting the site is the Livermore Airport, located about 2500' south of the site's southerly boundary. Official noise contours for the airport forecast to 1995 are shown in Figure 22. These contours are generated by takeoffs and landings at fairly low aircraft elevation. Figure 23 depicts normal flight patterns at the airport; note that one basic approach is directly over the site, and that a portion of a landing pattern affects the southerly portion of the site. Planes enter the area at an altitude of 1,400'- 2,000'; descending to about 1,000' over the site; then flying westward before turning to land.

70 L_{dn} is generally accepted as the limit of desirability of residential construction in terms of noise exposure. Noise between 55 and 70 L_{dn} may require special noise insulation features.

b. Impacts

The site plan submitted by applicants indicates three separate areas of town house development which would be affected by noise from I-580. Town house areas are designed imprecisely, in outline only, but they do reach as close as within 80' of the freeway right-of-way in many places. In between is a landscaped buffer area and, in the easterly portion of the site, a portion of the existing Collier Canyon Road to be retained as a frontage road. The pattern of town houses is not known at this time, but it is likely that some would be built within the 330' 1995 70 L_{dn} contour. These residences would be adversely affected by noise from the freeway both outdoors and indoors unless mitigation measures were taken.

The proposed new Collier Canyon Road would have a peak hour vehicle count of 805 (morning peak) north of its intersection with the collector road. Assuming, for the purpose of estimating noise impacts, an average vehicle speed of 40 mph, the nearest residences (53' from the nearest travel lane) would experience "Normally Acceptable" noise exposure, according to U.S. Department of Housing and Urban Development Noise Assessment

Guidelines (1971). "Normally Acceptable" exposure is defined as being great enough to be of some concern but common building constructions will make the indoor environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant for recreation and play. (Ibid.) The collector road will have projected traffic volumes of 905 vehicles at peak hour (evening peak), east of Collier Canyon Road. Areas adjacent to the collector road are designated for recreation and park use near Collier Canyon Road, and for town houses, condominiums, and an elementary school farther from Collier Canyon Road, where traffic volumes would be lighter. Assuming an average vehicle speed of 30 mph, residences set back 20' or more from the curb would experience "Normally Acceptable" noise exposure, even at the peak volume area of the road. Other segments of the road would experience less noise. Calculation of L_{dn} levels from another source's methodology (Wyle Laboratories), indicates that nearest homes would experience about 65 L_{dn} levels at the noisiest portions of the road. Conventional construction will normally suffice to mitigate noise impacts at that level. Thus, no significant adverse noise impacts would be generated by the collector road or Collier Canyon Road.

Although located entirely outside the official noise impact area of Livermore Airport, the site would experience noise impacts from aircraft. Single flyover events are not significant taken one at a time, but the steady daytime drone of planes approaching the airport on a major flight path is likely to generate complaints from future residents of the project. Airport operations average close to 600 per day. Pressure to curtail or modify operations could result.

Significant short term noise impacts would affect existing residences on Collier Canyon Road during construction. Heavy machinery travel and operation, and building construction would be the major sources. On-site noise would be generated for six years assuming that project phasing proceeds on schedule. Construction noise would also affect residents of completed phases after they move in. Off-site noise would be generated by construction of improvements to the Collier Canyon Road/I-580 interchange, and other road improvements.

c. Mitigation

Reduction of noise impacts from I-580 on future residential units can be achieved by various alternative methods, including setting back units 250' from the southerly property line, utilizing sound-proofing construction techniques in all affected units, and installing sound barriers. Of the various alternatives, it is likely that installation of sound barriers would be most cost effective. A 12' barrier wall installed between existing Collier Canyon Road and the freeway right-of-way would reduce noise for the second

floors of nearest units (assuming normal property line setbacks) by about 10 dB. The estimated 1995 80 L₁₀ dBA contour is about 90' north of the northerly freeway right-of-way; with the 12' sound wall the contour would define the 70 L₁₀ dBA level. Thus, units set back 90' from the freeway right-of-way, or about 10' back from the southerly edge of the areas designed for town house development, should experience satisfactory noise levels with the 12' barrier. Installation of such a barrier should be required of the developer as a provision of the Planned Development District and/or as a condition of approval of future tract maps which include the pertinent areas.

Mitigation for noise impacts due to aircraft operations associated with Livermore Airport is of questionable feasibility. Increased noise insulation of housing units may not be justified because no official noise standards would be exceeded; nor would such insulation mitigate effects upon the outdoor environment. A noise easement could be required of the developer and the development through provisions of the PD District, which would not abate the noise impact but might lessen potential adverse impacts on the airport from future residents of the project.

Construction noise is essentially unmitigable, although it can be reduced if noise control measures are written into contract specifications. Such measures include restriction of construction activity to normal working hours, weekdays only; proper muffling of earthmoving and other machinery; and minimizing the amount of earth to be moved and the number of times earth is moved. It should be noted that typically, construction truckers are independent operators and can be difficult to control regarding enforcement of performance standards.

6. Archeological Resources

a. Setting

Although little is known about early "Indian" culture in central Alameda County, it is surmised that the interior drainages of the County were inhabited at least by the time of Christ; and most certainly during the several centuries immediately preceding historical contact. First recorded contact was by Fages and Crespi in 1772 who noted significant "Indian" population in the Livermore Valley. Incomplete mission records reveal that a total of 618 converts were obtained from the area around what is now Livermore, Pleasanton, and Dublin (Chavez, Holman, and Love, 1975).

b. Impacts

An archival survey was undertaken using maps and records at the Regional Office of the California Site Survey at Sonoma State University. The check indicated that no historic or prehistoric

sites have been recorded on the site or directly adjacent. A general surface reconnaissance was conducted over the site, which revealed no traces of historic or prehistoric cultural resources (Archeological Resource Management, 1980).

c. Mitigation

No apparent historic or prehistoric cultural resources would be affected by the project. However, it is known that this portion of the Livermore Valley contains deeply buried prehistoric deposits that sometimes cannot be detected by surface reconnaissance. In the event that buried deposits (as evidenced by concentrations of charcoal, bone, human remains, artifacts, or unnatural rock) are unearthed during construction excavation, all excavation should be halted temporarily within 50 meters of the find, the Planning Department notified, and a qualified archaeologist called in to examine the find and to make appropriate recommendations.

7. Public Plans and Policies

a. General Plan

The Livermore-Amador Valley Planning Unit General Plan was adopted by the County Board of Supervisors in 1977. It designates the lower portion of the site, below about the 500' elevation line, for low density residential use (3.6 - 6.6 housing units per gross residential acre) and the upper portion, above 500', for suburban density residential use (1.0 - 3.5 housing units per gross residential acre). Project proponents have decided to leave most of the site above 500' in open space, transferring density to the lower portion of the site. Housing units per gross residential acre average about 7.25. Density for the entire site is about 4.45 units per acre.

Designation of the site for housing indicates, according to the General Plan, an acceptable pattern of development to be achieved through the 20 year plan period (1975-1995), provided that the process of change and development indicated on the diagram are supportive of plan goals and objectives and consistent with plan policies. Goals, objectives, and policies of the plan which are relevant to the project are given below with a brief assessment of the project's compatibility.

Urban Growth: Rate and Amount:

- . "To phase urban development so that growth will occur in an orderly manner and community services can be provided efficiently."

Implementation of the project would require setting up a new governmental entity, a County Service Area, to provide certain essential services such as sewer and fire

protection service. An entirely new urban infrastructure would have to be constructed. These methods of providing services are of questionable efficiency in light of proximity of the project to the City of Livermore, which is better able to provide municipal services. However, the City would not consider extending services to the site for 15 - 20 years, because residential growth can be accommodated within the City limits until then, under the City's present growth policies. (These policies are currently under review by the City).

- . "To achieve a better balance between commercial and industrial uses and residential development through the allocation of scarce community resources, such as sewage treatment capacity."

The project would worsen the existing imbalance between housing and employment (commercial/industrial uses) in the Valley. Project proponents claim, and current trends indicate, that within 10 years, employment growth will overtake available housing so that the imbalance will shift toward employment; at that time, additional housing would be needed.

Residential development on the site would foreclose its use for industrial development, which might be practical due to proximity to the Livermore Airport, I-580, and new industrial development near the airport in the City.

Development Pattern:

- . "Within the context of LAFC policies for two Valley Spheres of influence, promote the three existing Planning Unit communities as centers of future urban development."

The project represents urban development outside the three existing Valley communities and outside urban Sphere of Influence lines, although LAFC has modified its policies to allow consideration of urban development outside the Livermore Sphere of Influence.

- . "To promote the filling-in of areas where the development pattern is fragmented and encourage development contiguous to established urban areas in order to consolidate urbanization and efficiently provide services."

The project is located on the fringe of an urbanized area and would represent the opposite of infill concepts.

Control of Urbanization and Responsibility for Services:

- . "All urban development shall be within incorporated areas in order to promote the coordination of land use planning and provision of urban services."

The project is located outside incorporated areas.

- . "To discourage the establishment of special districts that provide public services to urban development and do not have the authority to plan land use in order to discourage sprawl, fragmented development, and fragmented governmental control of services and planning."

The project would require formation of a special district, a County Service Area, to provide certain services. The CSA would be governed by the County Board of Supervisors, which also has land use authority. However, responsiveness to the needs of future residents of the area could be problematic, because although major decisions affecting their community and finances would be made by the Board, the community would be represented by only one supervisor and only constitute a fraction of that supervisor's constituency.

Air Quality:

- . "To guide the rate, amount, and location of development to ensure that air quality is improved to and maintained at State standards."

The rate and amount of development would be accelerated by this project over and above the Valley cities' planned growth rates (which are based, in large part, upon air quality considerations). The location of development is detrimental to achievement of air quality standards to the extent that project residents would need to drive considerable distances to schools, shopping, and employment centers. To the extent that developer's contention that the development would help attain a residential/employment balance in the future, this consideration would not be as significant.

- . "To reduce automobile usage through increased employment which will reduce commuting to work, through transportation improvements and through land use patterns."

The land use pattern exemplified by the project relies upon automobile use.

Housing:

- . "To promote low and moderate cost housing through allocation of scarce facilities and resources. To encourage a choice of housing type by provision of multiple family housing."

The project, although not likely to supply low and moderate cost housing, would include a variety of housing types.

- . "To locate housing convenient to places of employment and shopping by public transportation."

The site is located relatively far from places of employment and shopping and is not served by public transportation.

Transportation:

- . "To reduce the amount of routine travel, such as to shopping and work, through planned patterns of land use."

The project would require future residents to travel relatively far to shop, work, and schools.

- . "To recognize the Livermore Airport as a general aviation facility and support its expansion to handle increased operations which does not adversely affect surrounding areas in terms of safety, noise, traffic, and air quality."

The project might affect future growth of the airport due to future residents' complaints about noise and safety, although the project does not conflict with Airport land nor Commission plans for the Livermore Airport.

Agriculture:

- . "To guide urban development toward less productive lands, preserving for agricultural use those remaining un-urbanized Class I and Class II soils, soils which are capable of growing valuable crops (such as grapes), and as much land which can support the grazing of animals as possible."

Although the project would cause the loss of very good grazing land soils (refer to Soils section), no Class I or Class II soils are located on the site.

b. Zoning

The property is zoned "A" (Agriculture). The "project" is rezoning to a PD (Planned Development) District. After

public hearings and recommendations by the Planning Commission, the Board of Supervisors takes action on the PD. If approved, requirements of the PD Zoning District would include all maps, documents, and provisions adopted by the Board. After rezoning to PD, tentative subdivision maps would be submitted by applicants in conformance with the PD District requirements to be acted upon by the Planning Director. PD Districts are established to encourage the arrangement of a variety of residential uses on suitable lands in such a manner that the resulting development will:

- . be in accord with the County General Plan;
- . provide efficient use of land that includes preservation of significant open areas and natural topographic landscape features;
- . provide an environment that will encourage the use of common open areas for community activities and other amenities;
- . provide variety in the siting of varied housing types and in the design of access and circulation facilities;
- . be compatible with and enhance the development of the general area.

The project as proposed contains many features in accord with PD principles, except that conformance with some General Plan policies is questionable, and use of land is not efficient in that completely new infrastructure and institutional arrangements will be necessary to provide services to the project.

c. Local Agency Formation Commission

Under the Knox-Nisbet Act, it is the purpose of the Local Agency Formation Commission (LAFC) to use its authority in case of proposed annexation, detachment or reorganization to prevent urban sprawl and to promote the orderly and efficient development of governmental services. The Alameda County LAFC has adopted spheres of influence for the cities of Pleasanton and Livermore which exclude the site from any urban sphere. "Spheres of Influence" are set by LAFC to encompass the probable ultimate physical boundaries and service areas of local governmental agencies. Under LAFC policies, urban development should be located within cities. Most recently, LAFC rejected a request by City of Livermore to place the site within its sphere. LAFC also, as part of the same action, in effect amended their specific policy for this area to allow consideration of development on the site outside the City.

Formation of the County Service Area for the project would have to be approved by LAFC. LAFC actions are subject to CEQA. This EIR is intended to fulfill requirements of CEQA with respect to LAFC actions. LAFC concerns about the project would include the efficiency of providing services as proposed; the future possible costs to the County of providing services; the possible displacement of demand for infill housing within the City of Livermore; and the timing of the project in relation to LAFC policies.

d. Association of Bay Area Governments Regional Plan

ABAG policies specifically pertaining to review of development proposals in the Livermore-Amador Valley were adopted by the ABAG Executive Board in connection with its review of the Las Positas New Town proposal in 1975. The policies essentially favor first priority for growth in areas where cities have made existing commitments, and second priority in areas where service capacity and governmental mechanisms are in place to ensure balanced and managed development in accordance with consistent Valley-wide plans and policies, and also to provide a better jobs-residences balance in order to ameliorate pressing environmental problems in the Valley relating to air quality, water quality, and public service delivery. In addition, increased opportunities for low and moderate income persons to live and work in the Valley should be provided. Until the Valley's problems are resolved, any substantial increase in population would potentially be in serious conflict with regional policies.

The project is located in an area which has no service capacity or adequate governmental mechanism, and would substantially increase the Valley's population irrespective of planned development in the existing urban centers. In these respects, it potentially conflicts with ABAG policies. It is noted that the site was designated for residential development on the 1977 General Plan in part to allow for growth pressure expected as a result of eliminating the Las Positas New Town proposal from Plan designation; the latter project would have significantly greater impacts due to its massive size. However, Las Positas proponents have indicated that they intend to resubmit their proposal, and indications are that the County would look more favorably upon it than in 1977.

The project would supply a variety of housing types. However, due to high special charges for future residents for services it seems unlikely that the housing would fulfill low and moderate income needs without some form of subsidy.

e. Other Pertinent County Policies

The Alameda County Board of Supervisors has adopted a number

of policies which pertain to a development such as the proposed project. The Discrete Sewage Disposal Systems Policy, adopted July 27, 1978 (Appendix B), states that a community system such as that proposed should be employed only when determined acceptable by the Board of Supervisors and the Regional Water Quality Control Board on the basis of an EIR for the specific project and system. Technical, Managerial, financial, and operational requirements are also given in the Policy statement. Planning for the system has been carried out with close coordination with Regional Water Quality Control Board and with the technical and other requirements in mind. It appears that the system is environmentally, technically, and operationally acceptable based on information in the Sewage Disposal section of this report. The question arises as to the role and size of the treatment system operator, presumably the County Public Works Agency, in the context of existing and proposed Valley wastewater management systems.

On February 17, 1981, the Board of Supervisors adopted "Alameda County Process for County Service Areas to Provide Public Services," which sets forth requirements and responsibilities for considering County Service Area formation through the zoning/subdivision application process. (Refer to Appendix C). Under this policy, applicants have submitted detailed plans for construction, operation, maintenance, and financing of utility systems to serve the project.

A special policy was adopted by the Board on December 7, 1978, which applied specifically to any development proposed on this site. The policy is intended to prevent such development from imposing additional costs on the rest of the County by having the development pay for itself insofar as utilities, fire and police services, schools, parks, and other amenities are concerned. Applicants have attempted to comply with this policy, as discussed in the Fiscal Impacts section. A policy was adopted by the Board on April 15, 1980, of not using County Service Areas to extend governmental services into new developing areas unless there are "unusual circumstances". If this policy is followed, the Board will have to determine if "unusual circumstances" exist in the case of Northbluff.

f. Livermore General Plan

The Livermore General Plan includes the site as part of the City's planning area, although its influence is minor since the site is not within the City's Sphere of Influence as adopted by LAFC. The City's Plan designates the site for agricultural use. The City has expressed interest in eventual Airport-related industrial development on the site.

The project would foreclose that possibility.

g. California Urban Strategy

The State Office of Planning and Research prepared a booklet, An Urban Strategy for California (1978), which State agencies are to use when making decisions affecting development. In the case of the project, Caltrans may have to approve an encroachment permit for work within the I-580 right-of-way. Other State agency approvals of various aspects of the project may be required. Thus, the Urban Strategy is included here as relevant to the project. The essence of Urban Strategy calls for new urban development in California to be located according to the following priorities:

First Priority: Renew and maintain existing urban areas, both cities and suburbs.

Second Priority: Develop vacant and under-utilized land within existing urban and suburban areas and presently served by streets, water, sewer and other public services.

Third Priority: When urban development is necessary outside existing urban and suburban areas, use land that is immediately adjacent. Noncontiguous development would be appropriate when needed to accommodate planned open space, greenbelts, agricultural preservation or new town community development.

The project would appear to fall outside the three priorities.

Transportation policy of the Urban Strategy follows the general priority scheme outlined above, with an emphasis on providing service through public transportation facilities. The project would be auto-dependent due to its design and location and would thus be inimical to carrying out the Urban Strategy policies.

8. Fiscal Impacts

a. Setting

This section is based on the Public Services Plan and Fiscal Analysis prepared for the Northbluff development (Angus McDonald & Associates, Inc., 1981). This Public Services Plan has been adopted by Broadmoor Development Company and is part of the project proposal. Details of the Plan summarized below

are discussed in the respective Services and Utilities sections of the EIR.

The following table summarizes public services required and agencies proposed by the developer to provide the services. Major capital facilities required for the services are also listed in the table. All direct capital items will be provided by the development. These include:

- . Fire station and equipment
- . Flood control system
- . Streets and street lighting
- . Open space
- . Water and sewer systems
- . Park (9.6 acre park on-site, fully improved)
- . School (elementary school on-site)

Police, water, road and storm drain maintenance, irrigation and parks, solid waste disposal, education and library services are proposed to be met through current service providers, while on-going costs for these services are proposed to be met by normal public resources.

Fire protection service, sewage disposal, and street lighting maintenance would also be provided primarily by existing agencies, but the funding for these services would be provided in whole or in part through a County Service Area (CSA) for Northbluff.

A County Service Area (CSA) is governed by the County Board of Supervisors and is established to provide, and pay for, urban services not otherwise available in the unincorporated area.

Actual formation of a CSA would require institution of proceedings by the Board of Supervisors and approval by LAFCO. During February of this year the Board of Supervisors and LAFCO passed resolutions indicating that formation of a CSA would be considered for Northbluff.

Revenue sources for the CSA would be user fees plus an urban services charge that could be approved by the property owner, since the area is currently uninhabited. Deeded conditions, covenants, and restrictions that run with each ownership could also specify that residents continue to make payments to the Northbluff CSA for urban services of general benefit.

TABLE 20

PROPOSED PUBLIC SERVICE PROVIDERS FOR NORTHBLUFF

	County Government	Northbluff CSA	Existing Independent District	Private Organization	Name of Service Provider	Capital Facilities Required
<u>General Government</u>						
1. Administration, Finance Records, Elections (Average Cost)	•				Alameda County Government - General Fund	None
<u>Public Protection</u>						
2. Police Protection (Incremental), Courts - Detention - Corner (Average Cost)	•				Alameda County Government - General Fund	None
3. Fire Protection (Incremental)	•	•			Alameda County Structural Fire Protection	Fire Station and Equipment Fire Truck
4. Flood Control	•				Alameda County Flood Control District Zone 7	Collier Creek Enlargement
5. Planning, Code Enforcement, & Engineering	•				Alameda County Government - Charge Back	None
<u>Public Works</u>						
6. Street Maintenance	•				Alameda County Road Department - Road Revenues (Gas Tax)	All Roads & Meridian Landscaping All Storm Drains All Stop Signs
7. Street Cleaning	•				Alameda County Road Department - Road Revenues (Gas Tax)	
8. Street Lighting	•	opt.			Alameda County Road Department - Special Assessment	
9. Open Space Maintenance		•		•	Home Owners' Association with Maintenance of the Secondary Waste	
<u>Water and Sanitation</u>						
10. Water				•	Flood Control District #7 (Wholesale); Cal. Water Co. (Retail) - operational; Northbluff CSA (Retail)	Transmission line Storage Tank - pump Distribution System - Meters
11. Sanitation		•			Northbluff CSA - Operated by the County Public Works Agency	400,000 gallon day Collection and Treatment System (secondary treatment with spray irrigation for disposal)
12. Solid Waste				•	Oakland Scavenger Co. - Contract Franchise Alameda County Government	None
<u>Recreation and Culture</u>						
13. Park and Recreation			•		Livermore Area Recreation & Park Dept.	9.6 Acre Neighborhood Park
14. Library	•				Alameda County Government	None
<u>Education</u>						
15. Elementary & Secondary			•		Livermore Unified School District	Elementary School (15 classrooms,

In the case of fire protection, the CSA would supplement property tax revenues to the County Structural Fire Protection District so that the County Fire Patrol would be fully funded for the on-site fire protection services it will provide.

The CSA would fully fund all necessary on-going sewer treatment services, with technical operation and maintenance proposed to be provided by the Alameda County Public Works Agency under contract to the CSA. The sanitation plant would need to be in place prior to any occupancy. A two-tiered fee structure is proposed for operation of the plant during the build-out period. Unoccupied building sites would pay an availability charge for operation and maintenance of the system, while occupied sites would pay a user fee that reflects the operation and maintenance costs of processing their sewage flow. The user fee paid by occupied sites would be higher than the availability charge.

Maintenance of the street lighting system would be funded by the CSA based on a user fee for all property owners on lighted streets. This service would be provided by the County Road Department, under contract to the CSA.

In addition to existing governmental services and the Northbluff CSA, a property owners' association would be established to maintain the open space and private recreational facilities in the project.

b. Impacts

Significant governmental costs and revenues associated with Northbluff have been analyzed by Angus McDonald & Associates. This section is based on the McDonald fiscal analysis. (Angus McDonald & Associates, Inc., 1981). Scope and methodology of the analysis are described in Appendix D. All estimates in the analysis are expressed in terms of dollars of constant 1980 purchasing power.

The McDonald analysis was reviewed by affected public agencies. Significant agency comments on the analysis, particularly those from the County Administrator, the LAFCO Executive Director, the City of Livermore and the Regional Water Quality Control Board were consolidated and transmitted to McDonald for response. A summary of this transmittal along with McDonald's comments are attached as Appendix E. Where appropriate, the fiscal analysis has been updated to reflect more conservative assumptions of reviewing agencies for property tax and sales tax revenue and for fire protection costs.

1. Costs

a. General Government

The Administrative costs of County Government include legislation, finance, County Counsel, personnel, property management, elections, promotion, and records. Since these services benefit both residential and other properties, costs have been allocated to both, using average cost methodology. . These administrative costs come to \$19.25 per person and \$497.90 per acre of commercial or industrial land in Alameda County.

General government also includes the costs of public assistance, health and sanitation. These have been allocated only to residential development and come to a total of \$221.15 per person in the County.

The combined general government costs generated by the Northbluff Development are calculated based on population increases (and commercial acreage) over the phased build-out of the project, as shown in the following table:

Table 21

COUNTY ADMINISTRATION, PUBLIC HEALTH/WELFARE COSTS
(in 1980 dollars)

<u>Year</u>	<u>Population</u>	<u>Commercial</u> <u>Acres</u>	<u>Cost</u>
1982/83	630	2	\$ 152,450
1983/84	1,625	4	392,640
1984/85	2,700	6	652,070
1985/86	3,250	6	784,290
1986/87	4,195	6	1,011,470
1987/88	4,510	6	1,087,190

b. Police Protection/Courts

Police protection services involve both average and incremental costs. Incremental costs are those of patrolling Northbluff, while average costs include services shared by all Alameda County residents, such as the "911" telephone emergency dispatch service, courts, detention/corrections, coroner's office, and animal control. Using the average costing methodology, the costs of these general police and related services are \$48.42 per person and \$806.82 per acre of commercial/industrial land.

Incremental costs have been tentatively estimated at a total

of \$160,000 per year, which covers one full-time patrol (\$130,000 for 4.5 men at \$28,900 per patrolman) plus \$30,000 for equipment and support, at the time of full project development.

Since the \$160,000 per year incremental cost will only be required at full build-out, this cost has been allocated on a per capita basis for the project over the six-year development period. The cost is figured at \$35.48 per person (\$160,000 divided by 4,500 project population). The combined projections for both average and incremental costs over the project development period are illustrated in the following table:

Table 22
POLICE SERVICE COSTS
(dollar figures in 1980 dollars)

<u>Year</u>	<u>Population</u>	<u>Commercial Acres</u>	<u>Cost</u>
1982/83	630	2	\$ 54,470
1983/84	1,625	4	139,560
1984/85	2,700	6	231,370
1985/86	3,250	6	277,510
1986/87	4,195	6	356,800
1987/88	4,510	6	383,230
<hr/> \$160,000 - 4,510 population =			\$ 35.48
4.5 patrolmen at 28,800 =			\$130,000
Auto and misc. support			<u>\$ 30,000</u>
			\$160,000

	<u>Per Person</u>	<u>Per Acre</u>	
Incremental cost	\$35.48	-	
Average cost	<u>48.42</u>	806.82	
	\$83.90		
Population - 4,510	378,390		
Commercial acres - 6		\$4,840	\$383,230

Source: Alameda County Budget 1980/81 - Chief
Harold Walker, Alameda County Sheriff's Office -
McDonald & Associates.

c. Fire Protection

Based on an interview with the County Fire Protection Agency, fire service needs for the development have been identified as a minimum of one 2-man engine company with one truck located on or near the site. However, Chief Deputy Fire Warden Rafael would prefer a 4-man, or 3-man company with two trucks that would also serve the surrounding area.

For the purposes of determining costs for the Northbluff Development, one-time costs for an on-site fire station with one 1,000-gpm pumper and 500 gallon storage capacity, totaling \$350,000 have been assumed. These costs would be paid by the developer and will not burden costing fire protection agencies. In addition, a 3-man engine company (3 men on duty 24 hours per day, 7 days per week) is proposed. This level of protection should assure a fire insurance rating by the Insurance Services Office of 6 or less. This rating would permit residents to purchase insurance at rates typically applicable to well-protected urban areas.

Since Northbluff is an urban type development, fire protection should be staffed and costed out, using standards for an urban fire protection district. As recommended by the LAFCO Executive Officers, Castro Valley Fire Protection District standards have been applied for staffing the three-man engine company which includes three Captains, three engines, and four fire fighters. Castro Valley standards are also used for salaries, benefits and supplies. Fire protection costs are illustrated on the following table: (on page 95)

Table 23
FIRE PROTECTION COSTS USING CASTRO VALLEY
FIRE PROTECTION DISTRICT STAFF REQUIREMENTS
AND COSTS
 (IN 1980 DOLLARS)

<u>Position</u>	<u>Man-Year</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Captains	3.0	\$ 27,156	\$ 81,470
Engineers	3.0	24,144	72,430
Fire Fighters	<u>4.0</u>	<u>22,800</u>	<u>91,200</u>
TOTAL	10.0		\$245,100
Benefits (PERS, medical, insurance, etc.) at 34 percent of salary			83,330
Plus Supply Costs - at 12.2 percent of salary			<u>29,900</u>
TOTAL ONGOING ANNUAL COSTS			\$358,330
One time start up costs (provided by developer)			
Land and Station	\$250,000		
Pumper	100,000		

Phasing of fire protection service is proposed to occur during the build-out period, with the 1,000 gallon pumper acquired in the first year, and housed temporarily at the County Fire Patrol Station located 8 minutes away. The actual time to build a fire station at Northbluff will be based on a negotiated agreement between the developer and the County. For comparative purposes, analysis of fire protection costs assumes that an operating station would be installed at Northbluff in the second year of the project's development, when the project will be one-third complete. Annual cost in 1980 dollars would be \$358,330 starting in 1983/1984.

d. Flood Control

Storm drainage will be an in-street system provided as an integral part of the Northbluff development. Maintenance is handled by the County and is paid for from the County Road Budget.

e. Planning, Code Enforcement and Engineering

Cost to the County for processing a major proposed project such as Northbluff is paid for by Planning Permit Application fees and Inspection fees. Actual costs, including overhead, are paid by the developer. Thus, there is no direct cost to the County.

f. Street Maintenance, Sweeping and Lighting

The Northbluff Development will have a total of 5.5 miles of new streets at completion. Although the streets initially will require little or no maintenance, for cost analysis purposes we have conservatively figured costs beginning as each section of new road is completed. Street maintenance costs are estimated at \$2,000 per mile per year. Street sweeping, also handled by the County Road Department, is estimated to cost \$240 per year. The combined costs of street maintenance and sweeping, phased over the project development period, are shown on the following table:

Table 24
STREET MAINTENANCE AND SWEEPING COSTS
(in 1980 dollars)

	<u>Added</u> <u>Miles</u>	<u>Total</u> <u>Miles</u>	<u>Street</u> <u>Maintenance</u> <u>(\$2,000/mile)</u>	<u>Sweeping</u> <u>(\$240/mile)</u>	<u>Total</u>
1982/83	2.9	2.9	\$ 5,800	\$ 700	\$ 6,500
1983/84	1.4	4.3	8,600	1,030	9,630
1984/85	.4	4.7	9,400	1,130	10,530
1985/86	.5	5.2	10,400	1,250	11,650
1986/87	.3	5.5	11,000	1,320	12,320
1987/88	-	5.5	11,000	1,320	12,320

Source: Broadmoor Development Company and McDonald & Associates

Street lighting will all be installed by the developer. Maintenance costs for street lighting could be paid for with a benefit assessment fee collected through the CSA, with a net cost to the County of zero.

g. Open Space Maintenance

On-site open space in Northbluff is proposed to be maintained by the property owners, through a Homeowners' Association. Therefore, there will be no cost to the County or other governmental agencies. The secondary treated water from the Northbluff Sanitation System will be sprinkled on the open space. This system would be owned and maintained by the Northbluff CSA.

Homeowners' Association fees are based on their levels of homeowner requirements. The least expensive would cover costs of median maintenance and possibly some common area maintenance at a cost of approximately \$300 annually. The second level would add the cost of maintaining a recreation facility and swimming pool for an additional \$800 to \$900 per year. The third level would be required for condominium owners for common wall, roof, and grounds maintenance, for a total of approximately \$1,500 annually.

h. Water Service

Capital improvement costs of building the water system for the Northbluff project will be provided by the developer, and all of the on-going maintenance costs will be paid for by use fees to the private water company.

Since all direct capital and annual costs are paid for, there will be no cost to existing government agencies. If anything, there could be some surplus revenue to the California Water Company, the County Flood Control District Zone 7, or the County Service Area should it provide water service. However, this report has assumed a cost/revenue balance of zero.

i. Sewer Service

The sanitation system for the project will be a separate sewage collection system, treatment plant, and sprinkling system for the development's open space. The capital cost as of March 1981 for the full system is estimated at \$4,810,000, and will be provided by the developer. Estimated annual operation and maintenance costs, including labor, materials and power for secondary and tertiary treatment, and for the disposal system, is \$614,500 per year, or \$358 per dwelling unit. On-going costs of

operating the system include fixed costs and variable costs. Fixed costs required to run the plant regardless of flow, are estimated at \$314,600 annually, and consist primarily of personnel costs. Costs that vary depending on amount of sewage flow involve chemical treatment materials and energy costs, estimated at \$244,900 per year at build-out. (Lowry & Associates, 1981).

j. Solid Waste

Solid waste services for the project would be provided by the Oakland Scavenger Company, with all costs offset by user fees. The administrative costs to the County Service Area for overseeing this service will be paid for by franchise revenue from the Scavenger Company.

k. Parks and Recreation

A 9.6 acre neighborhood park is proposed as part of the Northbluff Development. This park would be fully improved and dedicated to the Livermore Area Recreation and Park District by the developer, at no cost to the District.

The on-going costs of maintaining this park are estimated at \$6,000 per acre per year, for a total of \$58,000 annually, and maintenance would be assumed by the Livermore Area Recreation and Park District. Costs of special recreation programs would be paid for by user fees.

l. Library

Existing library facilities in the County are proposed to serve the new development. There would be no new capital costs as a result of the project. The on-going costs of providing library service for the new population at Northbluff are estimated by the County Librarian, based on existing Countywide averages, at \$11 per person per year. These costs thus total \$49,600 per year at build-out.

m. Education

Granada High School in Livermore can adequately serve the development for grades 9-12 with the addition of relocatable classrooms. The developer would finance the development of a K-8 school on the Northbluff site and dedicate it to the Livermore United School District. Thus, there will be no unfunded capital costs to public agencies for educational facilities to serve the new development.

The on-going costs of primary and secondary education operating expenses are provided by the State on a per

student basis. As noted previously, this is a result of the post-Proposition 13 shift in property tax revenues away from schools and toward the remaining property tax-supported services. Since on-going education costs are handled out of statewide revenues (with each district receiving funds based on student population), there is no direct fiscal impact on the School District from the developer.

2. Public Revenues

The essential question of fiscal analysis is whether adequate revenues will be available to support required public services.

Revenue generating potential for local government in California was profoundly changed by the passage of Proposition 13 in 1978. Proposition 13 requires that property taxes may not exceed one percent of a property's market value. The annual increase in taxable assessed value is limited to

- . Alameda County's share of property taxes
- . Sales taxes
- . Property transfer taxes
- . Licenses, fines, fees and interest
- . Federal revenue sharing funds.

State and federal funds allocated to the County for public assistance and welfare augment the County's general funds for these specific programs. For convenience, these funds are grouped with the general fund revenues in our analysis.

Other revenues earmarked to specific governmental functions include the shares of property taxes which are allocated to the Livermore Area Recreation and Park Department, the County Structural Fire Protection District, and the County Library. In addition, gas tax revenues may be used only for road purposes.

The following paragraphs describe these revenue sources in greater detail.

a. Property Tax Revenue

Property tax revenue from Northbluff depends largely, of course, on the increased taxable value of real property in the area, based on the residential and commercial build-out

schedule. However, two other factors affect the property tax revenues available to special districts and Alameda County: the limitations imposed by Proposition 13; and the share of total property tax revenue allocated to each jurisdiction.

As noted previously, Proposition 13 imposed a major limitation upon the manner in which property taxes are assessed. Unlike the system prior to Proposition 13, all increases in market value do not translate directly into increases in taxable value. Increases in taxable value are limited to two percent per year compounded, until a change in ownership occurs. The taxable increases are then again limited to two percent annually, until another change in ownership occurs. Thus, taxable value can equal no more than the fair market value of a property. Since inflation in real property values has averaged nearly ten percent annually over the past five years, the two percent increase in taxable value permitted each year actually results in a decline in taxable value in constant dollar terms, until a change in ownership occurs.

The assumptions used in developing a property tax model that simulates the effects of Proposition 13 are as follows:

- . Overall price inflation -- 10% per year
- . Turnover rate for residences -- 10% per year (Assumes 1 house in 10 changing ownership each year.)
- . Turnover rate for commercial -- '0' during study period

It is assumed that undeveloped land will be retained in its current ownership and tax value until it is developed.

The second factor is the share of the total property tax revenue made available to each jurisdiction. The property tax rate for a given jurisdiction is simply based upon the percentage share of the adjusted pre-Proposition 13 tax rate. In Alameda County, the revenues are allocated to the County's General Fund (42% of the property tax rate), the Livermore Area Recreation and Park Department (13%), the County Structural Fire Protection District (7%) and the County Library (6%).

Based on these assumptions and the build-out schedule for the 1,750 residential units and 6 acres of commercial land in the proposed Northbluff Development, it is possible to project property tax revenues generated over time. The development at build-out will generate the following revenues:

- \$726,270 per year for Alameda County
- \$229,040 per year for Livermore Area Recreation and Parks
- \$116,370 per year for County Structural Fire Protection
- \$ 94,820 per year for County Library

b. Sales Tax Revenue

A sales tax is levied against the gross sales price of most tangible property other than property sold for resale. Exempt items include food for home consumption, prescription medicine, newspapers and periodicals, and poultry and livestock. All cities and counties in California are required by state law to levy a 1% tax on sales (except for exempt items), in addition to the 4-3/4% levied by the state. A 1/4% tax is levied statewide for transit or transportation purposes, and voters in a county may elect to levy an additional sales tax of up to 1/2% for transit purposes. Approximately 99% of the city/county levy is returned to the local jurisdiction on a quarterly basis, with the balance retained by the state to cover administrative costs. The sales tax revenue returned is distributed on the basis of the location of the retail sales rather than the location of population. Sales tax revenues may be used for any municipal purpose.

In the Northbluff project, sales tax revenues for the County will be generated from the six acres of commercial land in the development, with build-out scheduled at one acre per year through the build-out period. Sales tax projections are based on a similar sized established local serving commercial development within the City of Livermore.

The County will receive virtually all of the 1% local sales tax generated in this new commercial development, amounting to \$39,720 annually at build-out.

c. Property Transfer Tax

Counties in California levy a tax on the transfer of real property. The rate is \$0.55 per \$500 of sales price value, except that existing mortgages assumed by the buyer are exempted from the tax.

The calculation of property transfer taxes generated by the Northbluff Development is based on the projected phasing schedule and sales prices, as well as the resale assumptions noted for property taxes above. Because of the greater

volume of sales during the project development period, this source of revenue will diminish significantly after build-out.

d. Licenses, Fines, Court Fees and Interest

Licenses include both residential and business related licenses issued by the County. Fines and bail forfeitures, imposed on those who violate the State Vehicle Code or local ordinances, also provide a source of revenue to the County. The fines collected within a county, whether the result of a citation by a county or state officer, accrue to the County. In addition, the County receives a portion of fine revenues from cities, to pay for county costs of courts and administration. Revenue from Vehicle Code fines varies according to an area's combination of street and highway network, and demographic characteristics. Revenues from Vehicle Code fines and bail forfeitures are restricted to expenditures for traffic safety, such as signals, driver education programs, signs, and other road improvements.

The combined source of income to Alameda County from licenses, fines, interest, and court fees is \$32.56 per person and \$643.41 per acre of commercial land annually. These County-wide average figures have been applied to the new Northbluff population and commercial acreage to project the revenue generated by the project.

e. Motor Vehicle in Lieu Fee

Each year, when a motor vehicle is registered, the State Department of Motor Vehicles collects a fee based on two percent of the market value of the vehicle. This fee is in lieu of personal property tax which would normally be levied by local governments. The Department of Motor Vehicles deducts its collection costs from this fund and distributes the balance equally among city and county governments in California, based on population. Vehicle revenue currently equals \$14.36 per capita and \$2.39 per commercial acre per capita in Alameda County. These figures were used for the revenue projection. Vehicle in lieu revenue is a general revenue which may be used for any public purpose.

f. Public Assistance and Welfare Revenues

Both the State and Federal Governments provide funding to counties for public assistance programs. In Alameda County, these state and federal funds currently average \$182.27 per person annually, paying for 80-90 percent of the costs of welfare, health, and public assistance.

g. Federal Revenue Sharing

Alameda County receives an annual grant from the Federal Government's General Revenue Sharing Program. This program provides a share of Federal tax revenues to state, county, and city governments throughout the United States. The long-term future of General Revenue Sharing is uncertain, and annual payments are subject to the Federal budget process. Nonetheless, while the debate in Congress includes proposals to eliminate revenue sharing for states, the program for cities and counties has strong political support and can be expected to continue.

The cities' and counties' portion of General Revenue Sharing is allocated in proportion to a complex weighting function which reflects population, tax effort, and relative per capita income. Low income communities are favored. In the absence of a major shift in social and demographic structure or a major shift in tax effort, federal revenue sharing responds to population. Alameda County received \$7.39 per capita and \$190 per acre for commercial in 1980. These figures were used for the projection.

h. Highway Users Tax Revenue (Gas Tax)

Both the State and Federal Governments levy excise taxes on gasoline, which are used for highway construction and maintenance. The federal excise tax on gasoline is \$0.04 per gallon. The total state excise tax is \$0.07 per gallon. Approximately 48% of the state excise tax is shared with cities and counties on the basis of motor vehicle registration, assessed value, population, and maintained road miles. Alameda County received \$10.50 per capita in fiscal year 1979/1980 from the State gasoline tax. This amount varies from year to year depending upon total state gasoline tax revenue collected and changes in the distributional factors. The figure \$10.50 was used as the per capita revenue for future gasoline tax receipts by the County.

The gasoline tax is based upon a State-levied, fixed tax on gallons of gasoline, rather than the value of gasoline. Annual gas tax revenues have remained relatively stable over the past 10 years, with increases due only to rising gasoline consumption. This growth has not approached the price inflation affecting road construction which has increased significantly faster than general price inflation. Unless the tax rate on gasoline is increased, the purchasing power of the levy will continue to decline. This problem is not unique to Northbluff; it is a county and state-wide problem affecting all road maintenance programs.

The estimate of the impact of the Northbluff Development on gas tax revenue did not assume a tax rate increase. It assumed, in effect, that per capita gasoline consumption remains constant and that per capita tax collections remain constant in nominal terms. The additional assumption was made that street maintenance costs increase no faster than overall price inflation. (This is an optimistic assumption, given the use of petroleum products in street maintenance, but it tends to offset the effect of a slight increase in per capita tax collections.)

The net result of the assumptions is that gas tax collections resulting from the project are directly proportional to population increase except that real (in contrast to nominal) purchasing power declines at a compound rate of 10% per year. (The average rate of inflation is assumed to be 10% per year during the 7 year study period.) This "deflation factor" is reflected in the projections of gas revenues.

3. Cost/Revenue Comparison

Based on the projections of local governmental costs and revenues contained in the previous sections, it is now possible to determine the fiscal effect of the proposed Northbluff project. As discussed above, capital costs will all be borne by the developer. The key question for policy makers is whether on-going costs are covered by on-going revenues. Comparisons of the costs and revenues for required public services are discussed below.

a. General Fund

There is a general surplus of general fund revenues over costs, beginning in the first year and increasing to \$443,780 in the fifth year. In the sixth year, the surplus drops slightly to \$408,140, due primarily to decrease in revenues from property transfer taxes that occur at a higher rate during the new sales period. From 1988/89 onward, the annual surplus remains relatively constant.

b. Fire Protection

Major new outlays are required to provide fire protection to Northbluff. The Alameda County Fire Patrol's share of property taxes from the development is not sufficient to cover these costs. At build-out, the property tax revenue would be \$116,370, while annual cost of the 3-man engine company to serve the project is estimated at \$358,330.

Table 25

NORTHBLUFF FIRE PROTECTION COSTS AND REVENUES

(IN 1980 DOLLARS)

	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>
<u>Ongoing</u>						
Annual Costs		\$358,330	\$358,330	\$358,330	\$358,330	\$358,330
Revenue: Property Tax	\$ 22,200	53,900	81,460	93,850	115,030	116,370
Annual Surplus (deficit) for Special Tax Contribution	22,200	(282,230)	(276,870)	(264,480)	(243,300)	(241,960)
Annual Fee (per DUE ¹)	-0-	\$157	\$154	\$147	\$135	\$134

¹ "DUE" or "Dwelling Unit Equivalent" is defined as a "single family unit equivalent" - 1,750 residential and 50 commercial - total 1,800 units.

The Northbluff developer has proposed a special tax or a standby charge as part of the Northbluff County Service Area to meet this shortfall. This special tax would be structured to meet the difference between the operating cost of the Northbluff fire station and the property taxes generated for fire protection. The tax would be paid by the owner of each parcel on the basis of a single family dwelling unit equivalent (DUE), defined as the average level of service required by a single family unit. Commercial property is counted at 1300 sq. ft. equals one DUE. The tax would be charged whether the land is built upon or not. This means that a DUE charge would be paid by the owners of vacant parcels (on the basis of their potential land use as assigned in the specific plan) as well as by the homeowners who live in Northbluff.

Based on our analysis of costs and projected property tax revenues, the amount of the special tax would range from \$134 to \$157 per DUE during the development period, beginning in the second year when the on-site engine company becomes operational. This is illustrated in Table 25, on Page 105. The tax would stabilize at approximately \$134 per DUE annually after build-out.

c. Recreation and Parks

The development will provide a fully improved 9.6 acre park to be dedicated to the Livermore Area Recreation and Park Department. Costs of maintaining this new park are estimated at \$6,000 per acre, for a total of \$58,000 annually. On the revenue side, the development will be generating \$229,040 annually for the Recreation and Park Department at build-out. Thus there will be a \$171,040 annual net surplus to support the other activities of the Department.

d. Library

Similar to parks, the Northbluff Development will produce a substantial surplus for the County Library. Costs, at \$11 per person, would be \$49,600 per year at build-out, while property tax revenues to the Library would be \$94,820 for an annual net surplus of \$45,220.

e. Roads

County revenues for road maintenance come primarily from gas taxes, which are based on a constant amount per gallon (as explained in the revenue discussion above), while the costs of road construction and maintenance rise with inflation. However, with all of the 5.5 miles of new roads at Northbluff fully improved by the developer and with street maintenance and sweeping costs estimated at \$12,320 annually at

build-out, there will be a substantial surplus over the \$22,560 revenue in 1987/88. Even with the gradual deflation in the purchasing power of the gas tax income, revenues will exceed costs for many years.

4. Fiscal Analysis - General Conclusions

Northbluff will produce a total government surplus of revenues over costs. The revenue/cost balance is summarized in the following table. Services missing from the table - fire, sanitation, water and garbage - will have an annual cost/revenue balance surplus or a zero. The overall totals are included in this report for illustration purposes only, since each of the various agencies shown act independently and do not transfer services or revenues. (See Table 26, page 108.)

The surplus of on-going revenues over costs begins in the first year of construction and continues through the six-year period. In the sixth year, at build-out, the surplus is \$634,640 annually with an accumulated surplus to all agencies serving Northbluff of \$2,797,060.

The study concludes that the Northbluff Development, with the formation of a new CSA, would have a balanced cash flow for fire, sanitation, water and garbage service, while it would generate a positive cash flow for the County general government (including police service), road maintenance, library, and the Livermore Area Recreation and Park Department.

The Northbluff CSA should be structured so as to guarantee that services will be continuously provided from the beginning of construction through build-out and beyond. The financial structure of the CSA should allow for a slower build-out rate or less than 100 percent build-out of the project without liability to Alameda County.

For a variety of reasons, the actual fiscal balance might differ in timing or amount. Among these reasons:

- . Depending upon economic factors affecting the national and regional economies, it might be necessary to decrease the projected rate of development.
- . Changes in the sources of revenue currently available to local governments could also have significant effects. In particular, Assembly Bill 8 -- the "permanent" implementing legislation for Proposition 13 -- provides an escape clause for the school finance responsibilities assumed by the state. The general fund surplus would be of greater significance if other sources of funding are reduced.

Table 26

GOVERNMENT COSTS AND REVENUES - NORTHBLUFF

(IN 1980 DOLLARS)

		<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>	1987/88
General	- Costs *	\$206,920	\$532,300	\$ 883,440	\$1,061,800	\$1,368,720	\$1,470,420
Government	Revenues	328,430	794,610	1,232,960	1,430,530	1,812,500	1,878,560
	Net Surplus	121,510	262,410	349,520	368,730	443,780	408,140
Road	- Costs	6,500	9,630	10,530	11,650	12,320	12,320
Maintenance	Revenues (Gas Tax)	4,630	11,060	17,010	18,960	22,660	22,560
	Net Surplus	(1,870)	1,430	6,480	7,310	10,340	10,240
Park and	- Costs	58,000	58,000	58,000	58,000	58,000	58,000
Recreation	Revenues	43,690	106,090	160,330	184,710	226,390	229,040
	Net Surplus	-14,310	48,090	102,330	126,710	168,390	171,040
County	- Costs	6,930	17,880	29,700	35,750	46,750	49,600
Library	Revenues	18,090	43,920	66,380	76,470	93,720	94,820
	Net Surplus	11,160	26,040	36,680	40,720	46,970	45,220
Annual Net	- All Services	116,490	337,970	495,010	543,470	669,480	634,640
Surplus							
Cumulative	- All Services	116,490	454,460	949,470	1,492,940	2,162,420	2,797,060
Net Surplus							

* County Administration, Health-Welfare, Police Services, Fire and Sanitation indicate a Zero Net Cost/Revenue Balance

Source: McDonald & Associates

- Recent approval of the Gann Initiative has set limits on the ability of local governments to accumulate a revenue surplus in excess of their appropriation limits. Because of this legislation, it may be necessary to lower tax rates or rebate revenues to avoid accumulation of a surplus. Because of Alameda County's relatively high per capita Gann limit, it is unlikely that it would be pushed to its limit in the foreseeable future.
- Changes in either the price structure or the turnover rate for residential and commercial real estate could affect the cost/revenue equilibrium. Markedly different pricing levels for housing would influence both demand and the taxable value of the properties. Similarly, a different turnover rate would affect taxable value, and consequently the tax revenues available.
- The public service standards were discussed with each agency. Nonetheless, the public services providers may deliver a level of service that differs from the level recommended by McDonald & Associates.

IV. UNAVOIDABLE ADVERSE IMPACTS

Impacts listed below are to some degree unavoidable given the location and type of project proposed. Other impacts are mitigable as noted throughout this report. Impacts for which mitigation measures are not required of the project must be added to those below.

- Loss of prime grazing land.
- Potential degradation of downstream water quality from urbanized runoff.
- Increased difficulty of attainment of air quality standards in the Livermore-Amador Valley due to project-generated emissions.
- Increased energy consumption due to higher than normal per unit energy use.
- Unknown risks to groundwater quality depending upon reliability, efficiency, and operation of proposed sewage treatment system.
- Inefficiency of providing many urban services to Northbluff because of unfavorable economies of scale and lack of overall plan for CSA's.
- Increased costs for future project residents for urban services compared to residents of existing urbanized areas, reflecting service provision inefficiency.

- . Marginal fire protection for the project until sufficient build-out is attained to construct, equip, and operate a fire station on the site.
- . Potential conflict with operations of Livermore Municipal Airport in terms of noise and safety.
- . Conflict with local, regional, and state plans and policies which give highest development priorities to infill areas where urban infrastructure and services are more readily available.
- . Possible jeopardizing of existing mutual aid agreements between City of Livermore and the County for fire and police services.
- . Potential growth inducement on adjacent lands and indirect growth inducement as a precedent for development on other lands with no urban infrastructure or services.

V. ALTERNATIVES TO THE PROJECT

A. No Project

This alternative would obviously eliminate all adverse physical and cultural impacts. The site would continue to be used for agriculture. The "no project" alternative would imply that other areas in the Livermore-Amador Valley should develop first, and that the site would best be developed toward the end of the General Plan period (about 1995), if then. Delay of developing the site would enable the overall wastewater management scheme for the Valley to be completed and used to help plan those site facilities; would enable study of the best way to provide services for this and similar Valley projects; would increase efficiency in providing services, infrastructure, and political structure to new development by guiding that development toward existing urbanized areas; would allow a clearer picture to be gained of the best type of development for the site in the long run, given proximity to the Livermore Airport and industrial development potential; and would allow the decision to be made based on disposition of the Las Positas New Town proposal, which, if approved, could influence residential development of the site.

B. Project In Another Location

Under this alternative, the same amount of residential units would be provided at another location or scattered among a number of locations. Impacts would depend upon the specific alternate locations. Any location similarly distant from existing urban services and infrastructure

would have similar impacts on the cultural environment. Physical impacts could be greater or lesser depending upon topography, proximity to areas of environmental significance, soils and geology, and other factors. A location in existing urban areas would have less impacts upon the cultural environment because, existing service providers could extend their delivery, avoiding the need to form a new governmental entity and the need to create new service infrastructure. Residences built at such locations could be cheaper (thus filling more housing needs) because initial and on-going costs to service them would be less. A separate sewage treatment plant, fire station, and school might not be needed, further reducing costs and increasing efficiency.

C. Industrial Project

The site could be developed for industrial uses. Land around the Livermore Airport just south of the freeway and the site, in the City, is being developed with light industry. Industrial development in the County would require a discrete sewage treatment system, a water delivery system with a storage tank, and roadway improvements including modifications of I-580/Airway Boulevard interchange. Demand on police services would be less. Provision of fire protection could be a problem; the amount of development may not support a fire station. As an alternative, buildings could be fully sprinklered. Impacts upon schools and recreational facilities would be minimal. Noise impacts would be minimal. Industrial development of the site would complement the Livermore Airport. If industrial development seemed likely for the site, Livermore would probably desire to annex it.

D. Annexation to Livermore, Development as Proposed

Under this alternative, the project would be given Alameda County approval, but annexed to Livermore either before or after construction. Police, fire and public works maintenance services would be provided by the City. The sewage treatment plant would fall under City operation. Because of a lack of sewage treatment capacity within the City to serve both the project and committed infill within present City limits, it is likely that a discrete plant would be needed even if annexation preceded development. Impacts on the physical environment, land use, traffic, air quality, energy, and of noise would be virtually identical under this alternative. Impacts related to service and utility delivery would be less because greater efficiency would be realized through extension of City services rather than creation of a new deliverer. However, provision of services would still be less efficient than to an infill development. Northbluff would have a similar relationship to the City as the Springtown development, north of I-580 to the east, whose residents have received a chronic shortage of City services because of their relative isolation.

If Livermore were to approve the project after annexation of the site,

its present development policies would have to be changed or ignored. Such policies include a two-percent annual growth limitation, and commitment to infill and incremental expansion of developed areas.

E. Alternative Project Concepts

A variety of alternative project concepts are available within the overall density limitations imposed by the General Plan. In essence, the project could be reduced in size (fewer units), increased in size (more units, higher densities), and/or changed with respect to the mixture of housing unit types. With a reduction in the number of units, traffic and air quality impacts would be proportionately reduced, but energy inefficiencies would probably generate higher consumption per household. Project feasibility would be highly questionable with less units to support a fire station, discrete sewage treatment plant, and County Services Area. Efficiency of providing these services would be worse than under the proposed project.

An increase in the number of units would worsen traffic, air quality, and noise impacts. Visual impacts could be worsened if more of the site were developed (the hill areas) to accommodate increased units. Somewhat higher efficiencies would be realized in providing services. More housing would tend to worsen existing housing/employment ratio in the Valley and would tend to make it more difficult to achieve balance in the future, thus aggravating VMT and air quality impacts.

Changes in the mixture of housing types would not significantly reduce impacts. The project as proposed contains a good variety of housing types.

VI. GROWTH INDUCING IMPACTS

The proposed project would be a relatively self-contained community. The sewage system, in particular, is sized to serve the project alone. Thus, direct inducement of growth caused by the project would be unlikely. However, indirect growth inducement on adjacent lands is possible because of introduction of a street system and infrastructure capable of expansion into adjacent lands. Experience has shown that new urban residents in developed areas adjacent to agricultural areas tend to complain about agricultural operations which produce odors, noise, and/or chemical applications. The agricultural operations experience a greater problem of pets interfering with farm animals, trespassing, and similar conflicts. Urbanization of the site would increase the value of surrounding lands, perhaps to the point where development becomes the only viable economic alternative use of the lands. All of these factors would indirectly tend to foster a demand for development of adjacent land. The project would supply much of the ingredients needed for urbanization, all of which (including the sewage treatment plant) would be expandable to serve additional development. If the project is approved, efficiency in facility sizing demands that adjacent properties be examined for development potential, for inclusion in the CSA, and for present and future service

needs.

On a broader level, the project would set a precedent and a procedure for urbanization of unincorporated lands. Demands would increase for property owners to set up County Service Areas providing services to their outlying properties, potentially developable with discrete sewage treatment plants and a new reservoir. Only strict adherence to General Plan policies would avoid proliferation of urban sprawl. But it may prove difficult to refuse prospective developers proposing CSA's, discrete sewage plants, and other similar development prerequisites in the future.

VII. ORGANIZATIONS AND INDIVIDUAL CONSULTED IN THE PREPARATION OF THIS REPORT
AND TO WHICH THE REPORT WAS REFERRED

Alameda County Flood Control, Zone 7
Alameda County Road Division
Alameda County Building Inspection Department
Alameda County Health Care Services Agency
Alameda County Sheriff's Department
Alameda County Administrator
Alameda County Fire Patrol - Livermore
Alameda County Local Agency Formation Commission
Alameda County Airport Land Use Commission
Alameda County Office of Emergency Services
Alameda County Auditor's Office
City of Livermore
Livermore Planning Department
City of Pleasanton
Pleasanton Planning Department
Livermore Valley Joint Unified School District
Livermore Area Recreation and Park District
Livermore-Amador Valley Water Management Agency
Livermore Airport Commission
Dublin San Ramon Services District
South County Community College District
Bay Area Air Quality Management District
Association of Bay Area Governments
Regional Water Quality Control Board
Cal Trans, District 4
Pacific Gas & Electric Company
Pacific Telephone Company
Alameda County Water District
California Public Utilities Commission
State Clearinghouse
A-OK Packaging Services
California Water Service Company
Purcell-Rhoades & Associates
David W. Carpenter, Engineering Geologist
Angus McDonald & Associates
Phillips Brandt Reddick
DKS Associates
Archeological Resource Management
Lowry & Associates
Broadmoor Development Company
Carl & Susan West
Fred Cook
Bob Abbott
Henry Gonzalves
Lucille Davina
Patricia and Arthur Waters
Martha Haapanen
Bedford Associates, Inc.

VIII. OTHER ORGANIZATIONS AND INDIVIDUALS TO WHICH THE REPORT WAS REFERRED

Livermore Library
Dublin Library
Pleasanton Library
Dublin Municipal Advisory Committee
Sierra Club, Livermore-Amador Valley Chapter
Valley Times
Tri-Valley Herald
Independent
Village Pioneer
Valerie Raymond
Robert Kingsley

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AIR QUALITY ANALYSIS APPENDIX

I. Stationary Source Emissions¹

A. Emissions from Natural Gas Consumption

1. (Emission factor) x (usage rate) = emissions
2. Emission factors for natural gas combustion are as follows in lbs/10⁶ft³:

CO 20

HC 8

NO_x 100

SO_x Negl.

Particulates 10

3. Usage rate is determined using the following provided in the SCAQMD, Air Quality Handbook for EIRs (October 1980):

Natural Gas Usage Rates

- o 109,500 ft³/du/year for single family detached du
- o 6,014 ft³/du/year for single family attached du
- o 240 ft³/ft²/year for commercial land uses
- o 42 ft³/ft²/year for the elementary school
- o 39.6 ft³/ft²/year for the sewage treatment plant

¹ The proposed project consists of 1,750 dwelling units (595 single family detached and 1,155 single family attached dwelling units), 91,476 ft² of commercial land uses (assumes 35% site coverage), 121,968 ft² for the elementary school (assumes 35% site coverage) and 68,607 ft² for the sewage treatment plant (assumes 35% coverage).

II. Mobile Source Emissions

A. Vehicular Emissions

1. Vehicle Miles Traveled (VMT) x Vehicle Emission Factor
= Emissions

2. VMT¹ = 161,520

3. Vehicle Emission Factors from EMFAC 6C Model for 1987
(assumes no Vehicle Inspection Maintenance Program)
and 35 miles per hour:

CO	7.74
HC	0.77
NO _x	1.70
SO _x	0.20
Particulates	0.32

B. Caline 3 and Gaussian Plume

Data inputs and results are presented on the following
computer readouts.

¹ From DKS Associates, September 1980. (Using 20,190 vehicle trips per day and an average trip length of 8 miles).

July 27, 1978

102

IMAGE

1254

Approved as to Form
RICH J. MOORE, County Counsel

By _____ Deputy

THE BOARD OF SUPERVISORS OF THE COUNTY OF ALAMEDA, STATE OF CALIFORNIA

On motion of Supervisor _____ Bort _____, Seconded by Supervisor _____ Cooper _____,

and approved by the following vote,

Ayes: Supervisors _____ Bort, Cooper and Chairman Santana - 3

Noes: Supervisors _____ None

Excused or Absent: Supervisors _____ George - 1

Abstained: Supervisor _____ Raymond - 1

THE FOLLOWING RESOLUTION WAS ADOPTED:

NUMBER 179175DISCRETE SEWAGE DISPOSAL SYSTEMS POLICY

BE IT RESOLVED that an Environmental Impact Report not be done for the adoption of a new Discrete Sewage Disposal Systems Policy, and that this Board's policy for the use of discrete systems, as stated in Resolution No. 177696, is hereby clarified to read as follows:

Discrete Sewerage Facilities PolicyA. Community Systems

Discrete sewerage facilities involving community systems should be used only for existing development to correct a water pollution problem where connection to an existing conventional system is not as cost-effective a solution, or where determined acceptable by the Board of Supervisors and the Regional Water Quality Control Board on the basis of an Environmental Impact Report for a specific project and discrete system.

When used, discrete sewerage facilities must conform with the following technical, managerial, financial, and operational requirements:

1. Technical requirements. Discrete sewerage facilities must:

- a. Utilize a proven design;
- b. Be designed by an engineer with established experience in the design of similar systems;
- c. Have equipment and components designed and constructed to allow repair without bypassing inadequately treated wastewater;
- d. Be capable of continuously providing a disinfected, secondary treated effluent;
- e. Where necessary to protect groundwater resources, utilize such design equipment and components as necessary to assure that concentrations of total dissolved solids (salts) in the discharge do not exceed the level present in the local domestic water supply.
- f. Have disposal areas that are designed, constructed, and operated in a manner that will insure maximum evap-transpiration and will minimize public exposure and environmental degradation.

Specific standards and other requirements to carry out the above objectives shall be adopted by the Health Care Services Agency.

2. Managerial, financial, and operational requirements. The management and financing of community systems should be provided through creation of a county services area, or provided by the Alameda County Flood Control and Water Conservation District or the County directly if a county services area is providing all other necessary urban services for the development. Operational services should be provided by a County entity such as the Public Works Agency or the Health Care Services Agency.

B. Individual Systems

Installation of additional discrete sewerage facilities involving individual systems (septic tanks, normally) should not be allowed in areas where concentrations of such systems presently exist. Where existing concentrations cause, or may cause, water pollution problems, public management of all systems in the area should be provided as for community systems under A.2. above, and continued use of individual systems in such areas should be subject to conformance with technical requirements a. and b. of A.1. above. Areas to which this policy applies will be delineated by the Board of Supervisors upon the advice of the Health Care Services Agency and the Alameda County Flood Control and Water Conservation District; such areas normally will not include lots 100 acres or more in area or isolated groups of four or less lots.

I CERTIFY THAT THE FOREGOING IS A CORRECT COPY OF A RESOLUTION ADOPTED BY THE BOARD OF SUPERVISORS ALAMEDA

COUNTY, CALIFORNIA JUL 27 1978

ATTEST: SEP 14 1978

WILLIAM MEHRWEIN, CLERK OF
THE BOARD OF SUPERVISORS

BY: Shirley Dault

**ALAMEDA COUNTY PROCESS FOR COUNTY SERVICE AREAS
TO PROVIDE PUBLIC SERVICES**

Adopted by the Board of Supervisors
February 17, 1981

1. **GENERAL PLAN:** The initial determination of the kind and extent of public services required for new development in the unincorporated area will be made in concert with the decision to designate land for urban uses on the General Plan. An urbanization proposal could be initiated either by the County in its periodic review of the General Plan or by a developer through a request for amendment. Only land meeting one of the following criteria will be designated for urban use under the General Plan. Land presently designated for urban use that does not meet one of the following criteria shall be redesignated:
 - a. Urbanization of the land is consistent with a city general plan, the city is willing and able to annex the land in the near future and the land is within the city's sphere of influence established by LAFCO.
 - b. The land is within or can be annexed to a governmental services entity other than a city, which entity is capable of serving the land; the land is within the entity's sphere of influence established by LAFCO; and urbanization is dictated by other planning policies.
 - c. The land cannot be annexed to or served by a city or other existing governmental services entity; provision of services through a new CSA, including sewage disposal through a discrete system, appears economically and environmentally feasible based on preliminary studies; and LAFCO has agreed conceptually to the formation of the CSA.

Prior to action by the Planning Commission or Board of Supervisors on land proposed to be designated urban under criterion #c above, the proposal shall be referred by the Planning Department to LAFCO for its conceptual agreement and to Public Works Agency, Health Care Services Agency, Alameda County Flood Control and Water Conservation District and Regional Water Quality Control Board for assessment of the general feasibility of serving such area by means of a discrete sewerage system and administering this and other needed services through a County Service Area. Once included in the General Plan, such land will receive detailed study to assure feasibility of the discrete sewerage system/CSA at the time actual development is proposed, concurrent with rezoning and subdivision approvals as detailed below.

2. **ZONING/SUBDIVISION APPLICATION:** When development approval is sought for land which has received qualified authorization under the General Plan for discrete sewerage system/County Service Area, the developer shall submit to the Planning Department with his application a detailed plan for providing services and this plan will be processed in the following manner:
 - a. The detailed plan must include formation conditions and long-term financing for the County Services Area, and detailed plans for the construction, operation and maintenance of the necessary utility systems and/or municipal services, including the following:
 - 1) Engineering design drawings for the construction of utility facilities, such as sewerage systems, with a detailed estimate of construction costs, long-term monthly/yearly operating costs, maintenance costs, and equipment replacement costs in sufficient detail to evaluate the proposal.

- 2) How the utility facilities and/or services are to be financed including:
 - i) Initial financing for construction, estimated monthly user charges, and the potential for future assessments which might be needed to meet contingencies. In addition, the plan will contain proposals to insure that, should the development period extend over a greater-than-anticipated length of time prior to buildout, or should the development never reach ultimate buildout, the operation and maintenance of the necessary facilities/services will be maintained without cost liability to the County. Alternatively, the plan might provide for deferred/delayed turnover of the facilities/service responsibilities to the County until after an economically feasible buildout level has been achieved.
 - ii) If the plan includes dependence upon services provided by agencies other than the County, the long-term commitment to such services must be detailed and contingency plans, if required, developed to insure continuity of all necessary municipal services.
 - iii) The detailed plan for providing services shall provide for dedication and conveyance to the CSA of all facilities, rights of way and appurtenances relative to the total development in fee simple and at no cost to the CSA.
- b. Upon receipt of such detailed plan, the Planning Department will refer the plan for review by the Public Works Agency, Health Care Services Agency, Local Agency Formation Commission (LAFCO), and, as appropriate, the Sheriff, the Alameda County Flood Control and Water Conservation District, including Zone 7 where necessary, and any other governmental entities or districts which would be concerned with the technical, organizational, financial, or environmental adequacy of the plan.
- c. Once the developer's plan has been referred out for comment, the Public Works Agency, as the potential administrator of the County Service Area, would assume lead responsibility for coordinating comments on the plan and developing recommendations as to its adequacy for presentation by the Planning Department to the Planning Commission and the Board of Supervisors. At such time as the details of the plan become sufficiently resolved so that a definitive recommendation for formation of a County Service Area can be presented to the Board of Supervisors, such a recommendation would be forwarded to the Board for "approval in principle," or "denial in principle," but in neither case for actual formation of the County Service Area.
- d. If the Board "approves in principle" formation of a County Service Area, then the Board would adopt a "Resolution of Application to Form a CSA" and the matter would be considered by LAFCO. If LAFCO gives permission, then the normal planning process would continue and the developer would submit subdivision plans to the Planning Department and Planning Commission under the provisions of the Map Act.

- e. The development's merits would then be judged in accordance with current planning procedures until ultimately the Planning Commission made a recommendation to your Board for approval or denial of said development. In the event that your Board approved of the development, the tentative map would be approved, and at the same time final proceedings would begin for formation of the County Service Area.
- f. Following tentative map approval, construction of facilities would take place under the supervision of the Public Works Agency as a part of the required subdivision improvements. The responsibilities of each department and agency which would normally be associated with this process are outlined on the attached page.

PROCESSING RESPONSIBILITIES FOR ESTABLISHING DISCRETE SEWERAGE SYSTEMS
AND COUNTY SERVICE AREA

I. PLANNING DEPARTMENT - Planning and Coordinating Entity

- A. Recommend policy for location of urbanization through General Plan.
- B. Review, conduct public hearings and act on rezoning and subdivision proposals. Coordinate technical review by Public Works Agency, Health Care Service Agency, and Alameda County Flood Control and Water Conservation District.
- C. Prepare EIR.
- D. Provide population data for determining facility location and sizing.

II. LOCAL AGENCY FORMATION COMMISSION (LAFCO)

Review proposal and approve or deny proposed agency formation based on established policy

III. PUBLIC WORKS AGENCY - Technical, Operational and Maintenance Entity

- A.* Staff for and review all proposals for discrete sewerage and other physical facilities.
- B.* Study and develop proposals for existing discrete sewerage facilities improvements where HCSA indicates inadequacies and health problems.
- C.* Define County Service Areas for service needs in consultation with LAFCO.
- D. Administer and process CSA discrete sewerage facilities improvement funding requests to Federal, State, etc.
- E.* Staff for operational and maintenance services for discrete facilities. May contract with other (public) agencies if more efficient.
- F. Establish service charges and billing procedures.
- G. Issue permits other than HCSA permits for use of individual discrete installations in consultation with HCSA and ACFC&WCD.
- H.* Perform other technical measures as may be necessary.

*These duties may be contracted to consultants until such time that a sufficient number of systems are operated to justify a full-time County staff.

IV. HEALTH CARE SERVICES AGENCY (HCSA)

- A. Regulation and enforcement of Federal, State and local health and environmental policies and standards.
- B. Issue permits for use of individual septic tank installations in consultation with ACFC&WCD.

- C. Monitor all discrete sewerage facilities which are not operated and/or maintained by Public Works Agency.
- D. Establish inspection programs for all discrete sewerage facilities.
- E. Review and recommend to approving agencies Discrete Sewerage Project plans and specifications.
- F. Technical input to other County departments.

**V. ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
(INCLUDING ZONE 7)**

- A. Regulate and enforce Federal, State and Local water quality control policies and standards.
- B. Review and recommend to approving agencies Discrete Sewerage Project plans and specifications.

APPENDIX D

SCOPE AND METHODOLOGY OF FISCAL ANALYSIS

A. Scope and Methodology

1. Nature of Impact Analysis

An impact is defined as the difference in outcome, measured between one and another course of action. An impact analysis -- whether fiscal, environmental, or whatever -- is intended to illustrate the effects of one course of action compared to some other reasonable course of action. In this report, the variable being analyzed is the fiscal impact, and the alternate courses of action are whether or not to build the Northbluff Development and no development.

To be useful, the fiscal evaluation must produce estimates and conclusions responsive to the needs of policy makers. Thus this report identifies and analyzes all significant governmental costs and revenues associated with the proposed Northbluff Development. By comparing all costs and revenues, it will be possible for decision-makers to identify the difference between the results of project development.

2. Average and Incremental Costs/Revenues

The fiscal impacts of a project may be projected by either an average or an incremental cost/revenue methodology. The choice of methodology should reflect the actual situation -- the extent to which costs or revenues are directly affected by the proposed development, which in turn is based on the

foregoing assessment of existing and new governmental services required.

Many governmental services are not directly affected by the Northbluff Development. For example, general County governmental programs of administration, welfare, etc. should be no more or less costly as a result of the development than they are without it. In these cases, the project's contribution to the costs can be represented by average figures applicable County-wide. That is, for each new person in the County, or for each additional acre of developed land, the costs of such governmental services will tend to be the same as they are now, per person or per acre, in the County.

On the other hand, some governmental services will involve significant costs that can be identified as a direct result of the Northbluff Development. This is the case, for example, with fire service. Since the development would not be adequately served by existing fire stations and staffing, a new company would need to be established specifically to provide necessary service for the project. These extra types of costs are referred to as incremental or marginal costs. The "increment" or "margin" is the cost attributable directly to the project.

As with costs, revenues can also be figured on an average basis or on an incremental basis. Examples of average-based revenues are marriage or business license fees. Thus for example, it is projected that there will be as many marriages

on the average for the new population in the Northbluff project as there are now on a County-wide basis.

An example of incremental revenue associated with the project is property tax. By identifying property values of the proposed development, phasing, etc., it is possible to calculate the tax revenue generated as a direct result of the project.

In the following fiscal analysis, all costs and revenues associated with the proposed Northbluff Development are identified, with the calculation based on either an average or incremental (or combined) basis, depending on the circumstances applicable to the particular governmental service or revenue source being analyzed. This combined approach provides the most accurate cost/revenue projections possible and accounts for both the direct and indirect fiscal impacts of the new development.

3. Average Costing Methodology

Services and income sources to which average costs and revenues apply have been calculated based on existing costs and revenues in the County. A methodology for determining existing average costs has been developed as follows:

- Costs are assigned to developed land based on percent of land currently in either residential or commercial/industrial land use. In Alameda County, 64% of developed land is in residential use, while 36% is in commercial/industrial use. (Undeveloped land is

assumed to require insignificant public services and is therefore not included.)

- Each cost/revenue item is categorized according to the land use requiring the service (or generating the revenue). Some services or income sources apply only to residential development, such as most health and welfare programs, inheritance taxes, etc. Other costs and revenues relate only to commercial/industrial development, such as business license fees. Most general government costs are allocated to both types of development, in which case they have been assigned on the basis of the 64% to 36% ratio described above.
- Once all such costs have been calculated and assigned to the type of land use, the average cost per unit is determined by dividing all residential costs by total population (1,098,500 in Alameda County) and dividing commercial/industrial costs by acres of that land use (23,891), yielding per person and per acre average costs (or revenues).

From this methodology, average costs and revenues for the Northbluff Development can be ascribed based on population increases and additional acres of commercial land uses.

4. Origins of the Estimates

As a general statement, local government revenues respond to external factors such as value of taxable property, location of retail sales, and the workings of statutory formulae such

as the Federal General Revenue Sharing allocation formula. Revenue forecasts can thus often be the subject of formal forecasting models that respond to these external factors. The revenue forecasts in the following sections are generally the results of such forecasting models.

Public services costs, on the other hand, do not respond exclusively to external factors. They vary depending on the decisions made by policy making bodies and administrators, as well as responding to external conditions. While there may be certain guidelines for services (such as a policy for police response time), the decisions on service improvements more often reflect the specific circumstances and intentions of the responsible agencies. A valid fiscal analysis must therefore be based on the actual intentions of the service providers.

The following cost estimates are based in part on adopted service policies of the County or the other relevant agencies. They also reflect an extensive set of interviews with the service providers to determine their public service plans and their assessment of the service needs of the proposed development.

5. Multi-Year Analysis

The analysis was carried out for each year of the proposed development and build-out period, as well as for the year after which build-out would be completed. This was done to assure that interim fiscal effects that might differ from the overall average would be highlighted.

6. Dealing with Inflation

In a time of high rates of price inflation it is essential that the effects of inflation be included in a fiscal analysis. This can be done in two ways. An estimate can be made of the rates of inflation, and all dollar figures for future years can be escalated to their estimated nominal value, including the effects of price inflation. The other alternative is to express all estimates in terms of dollars of constant 1980 purchasing power. The latter alternative is preferable, if for no other reason than that the resulting analysis is expressed in dollars that are currently meaningful to the policy maker.

The second alternative was followed in the present report, and dollars of constant 1980 purchasing power were used throughout the analysis. At the same time, an allowance was made for all cases where an uncorrected constant dollar assumption would distort the conclusion. For example, the effects of Proposition 13 are such that the taxable assessed value of new development cannot keep pace with actual market values. (More correctly, taxable assessed value could keep pace only if all property experienced a change in ownership each year.) Thus, the property tax base declines in terms of constant purchasing power. This effect was included in the analysis.

Another example is the allowance made for cost inflation in excess of average future rates for items (e.g., street lighting costs, and utility franchise revenues) that respond to energy costs. It was assumed that energy costs will continue to

increase faster than overall price inflation. A final example comes from the fact that the actual purchasing power of the County's gasoline tax entitlement is declining. The tax on gasoline is tied only to the number of gallons sold, and not to gasoline prices or road-related costs.

7. Scope of the Analysis

Consideration has been given to all public services and public revenues that might be significantly affected by the Northbluff Development. The analysis is not limited to the impact on Alameda County, but includes consideration of impacts on the School District, Recreation & Parks District, and sewer and water providers. The intent was to produce a document that will be useful to all policy makers affected by the proposed project.

Angus McDonald & Associates

2150 Shattuck Avenue Berkeley, California 94704
Telephone (415) 548-5831

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ALAMEDA COUNTY PLANNING
DEPARTMENT

August 12, 1981

Mr. Adolph Martinelli
Alameda County Planning Department
399 Elmhurst Street
Hayward, California
94544

Subject: Response to County Comments on
Northbluff Public Services Analysis; 757.05

Dear Mr. Martinelli:

This letter contains McDonald & Associates' responses to the issues raised in your letter dated June 23, 1981 to Barry Whittaker of Broadmoor Development Company concerning comments from Alameda County agencies on our Public Services Plan and Fiscal Analysis for the Proposed Northbluff Development. It is understood that your letter consolidates comments from the County Administrator, the LAFCO Executive Director, the City of Livermore and the Regional Water Quality Control Board.

In summary, the comments questioned the Northbluff Project's impact if different assumptions were used for property tax and sales tax revenue and for fire protection costs. The nature of these different assumptions are as follows:

- Property Tax. In the original analysis the annual turn-over rate for residential property was 1 parcel in 5 is sold annually. A test was completed using a turnover rate of 1 in 10 annually. Result - a 3.4 percent reduction in property tax.
- Sales Tax. The original analysis was based on a planned local serving commercial plan developed by the Irvine Company for a similar project. A test of sales tax was completed using actual sales tax data from Livermore. Result - a 16 percent reduction in sales tax generation.
- Fire Costs. The original analysis was based on staff requirements and costs supplied by the County Fire Patrol which currently serves the site. A test of fire costs was completed using Castro Valley Fire Protection District staff and cost structure. Result - a 27 percent increase in fire costs.

Table 1 indicates the cost/revenue impact on Northbluff when these alternate assumptions and data sources are applied. In general, the changes did not alter the positive fiscal impact that the development would generate for the county. The assumption about increased fire cost creates a corresponding increase in the "availability charge" that would have to be levied against the homeowners.

The responses to comments (presented below) are based on additional interviews with the affected public agencies.

1. Comment: "Construction timetable, ownership turnover estimates and sales tax projections are unrealistic. These revenue factors should be re-evaluated. Substantiation should be provided for final factors selected."

Response:

- A. The construction timetable represents the Development Plan phasing developed for Broadmoor by their planning consultants and their market research consultants. It would be realistic to say that each year actually represents conclusion of each phase of construction and residential occupancy. Thus each phase of development could represent anywhere from 6 months in actual time, if the housing market is doing well, to 2 or 3 years, if the market is depressed. These unpredictable variables are highlighted in the last chapter of our report.
- B. The ownership turnover rate of 1 house in 5 annually was used in our analysis to reflect the accelerated number of transactions that typically occur with a new housing development. The accelerated transactions assumption is based on two factors:
 - Speculative home buyers will purchase property in the early phases of a development on the hopes that the prices will increase markedly during the project development. This type of buyer will typically hold a property from 6 months to 2 years.
 - Some home buyers will purchase property with every intention of living in the development. After moving in they may find the development does not suit their needs.

TABLE 1
GOVERNMENT COSTS AND REVENUES IF LESS FAVORABLE ASSUMPTIONS ARE USED IN THE ANALYSIS
(IN 1980 DOLLARS)

		1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
General Government	- Costs	\$206,920	\$532,300	\$ 883,440	\$1,061,800	\$1,368,720	\$1,470,420
	Revenues	328,430	794,610	1,232,960	1,430,530	1,812,500	1,878,560
	Net Surplus	121,510	262,410	349,520	368,730	443,780	408,140
Road Maintenance	- Costs	6,500	9,630	10,530	11,650	12,320	12,320
	Revenues (Gas Tax)	4,630	11,060	17,010	18,960	22,660	22,560
	Net Surplus	(1,870)	1,430	6,480	7,310	10,340	10,240
Park and Recreation	- Costs	58,000	58,000	58,000	58,000	58,000	58,000
	Revenues	43,690	106,090	160,330	184,710	226,390	229,040
	Net Surplus	-14,310	48,090	102,330	126,710	168,390	171,040
County Library	- Costs	6,930	17,880	29,700	35,750	46,750	49,600
	Revenues	18,090	43,920	66,380	76,470	93,720	94,820
	Net Surplus	11,160	26,040	36,680	40,720	46,970	45,220
Annual Net Surplus	- All Services	116,490	337,970	495,010	543,470	669,480	634,640
Cumulative Net Surplus	- All Services	116,490	454,460	949,470	1,492,940	2,162,420	2,797,060

Source: McDonald & Associates

TABLE 2
PROPERTY TAX REVENUES
(IN 1980 DOLLARS)

Property Tax Revenue					
<u>Fiscal Year</u>	<u>Assessed Value</u>	<u>Alameda County \$1.685 per \$100 AV</u>	<u>Livermore Area Recreation & Park District \$0.5314 per \$100 AV</u>	<u>County Fire Patrol District \$0.27 per \$100 AV</u>	<u>County Library \$0.22 per \$100 AV</u>
1982/83	8,221,000	138,520	43,690	22,200	18,090
1983/84	19,964,000	336,390	106,090	53,900	43,920
1984/85	30,171,000	508,380	160,330	81,460	66,380
1985/86	34,759,000	585,690	184,710	93,850	76,470
1986/87	42,602,000	717,840	226,390	115,030	93,720
1987/88	43,102,000	726,270	229,040	116,370	94,820

NOTE: Assumes - residential property turnover of 1 house in 10 annually
 - commercial and open space property does not turnover
 - inflation at 10 percent

For the sake of comparison we have included an estimate of the property tax generated with a lower turnover rate of 1 house in 10 annually. This property tax estimate is shown in Table 2. The lower turnover rate reduces the property tax estimate by 3.4 percent at the project's buildout.

- C. Sales tax projections used for Northbluff commercial development (6 acres) are based on pro forma analysis generated by the Irvine Company for local serving commercial developments at a comparable project. However, for the sake of comparison, we have used an alternative sales tax projection based on a similar sized established local serving commercial development within the City of Livermore. These alternative sales tax projections, as shown in Table 3, are 16 percent lower than the original report estimates.

TABLE 3

COMMERCIAL DEVELOPMENT AND
SALES TAX GENERATION

	<u>Acres</u>	<u>Sales Tax Generated</u>
1982/83	1	\$ 6,620
1983/84	1	13,240
1984/85	1	19,860
1985/86	1	26,480
1986/87	1	33,100
1987/88	1	39,720

2. Comment: "The Fiscal Analysis does not properly distinguish between county-wide services and unincorporated area urban services. Costs of county-wide services elaborated in the LAFCO response differs from that in the Fiscal Analysis. The LAFCO approach results in a determination that cost of county-wide services is significantly higher than indicated through use of the average-cost methodology in the Fiscal Analysis; and consequently tax proceeds available to support unincorporated urban services for the site are significantly less than projected in the Fiscal Analysis. Methodology should be reconciled with

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representatives of LAFCO and the County Administrator and the Fiscal Analysis modified accordingly."

Response: We continue to assert that our procedures for dealing with county-wide services and unincorporated area urban services are correct. The estimates of cost of county-wide services (e.g., probation services) are based on county-wide averages. This probably overstates the impact of Northbluff on people-related services, given the nature of the proposed community, but may be appropriate from the standpoint of equitably distributing the tax burden county-wide.

The estimates of cost of urban services to the unincorporated area were not based on an average-cost methodology. Incremental costs were estimated, based on the actual public services delivery plans of the providers and their actual cost standards. We have limited differences of opinion with LAFCO regarding appropriate level of service and applicable unit costs. The significance of these differences is discussed subsequently but, regarding methodology, we certainly agree that cost estimates for urban services should be made on a true, incremental basis and used this approach in our analysis.

Two comments are appropriate regarding LAFCO's property tax revenue estimates. First, the procedure used by LAFCO is appropriate to an annexation rather than to our "base case," which assumes development in an unincorporated area. LAFCO staff's choice of methodology was a policy decision rather than an error. Discussions confirmed that their conclusion was that annexation is the appropriate government services alternative and that only the fiscal impacts of that alternative will be analyzed by them.

Second, during the review of the LAFCO staff work sheets, it was determined that their tax apportionment factors for property tax allocation to jurisdictions was calculated incorrectly. This was confirmed by LAFCO staff and the county auditor's property tax analyst. A revised analysis will be issued by LAFCO staff. The LAFCO staff work sheets were attempting to do three things.

- Estimate the amount of General Fund revenue the Alameda County government would lose if the Northbluff development were annexed to the City of Livermore.

- Estimate the amount of general government service costs (i.e., sheriff patrol) would be saved if annexation to Livermore occurred.
- Compare the revenue loss with the service cost savings to evaluate the county's cost/revenue impact.

Table 4 shows the corrected LAFCO work sheet. This table indicates that if annexation occurs, the county would lose \$415,950 in revenue while it would save only \$160,000 in sheriff's costs.

3. Comment: "Costs of fire station and equipment appear low, as do staffing and related salaries, benefits and supplies. These should be adjusted. Provision of fire protection during the initial stages of development requires additional analysis. City of Livermore indicates that it will not provide service for the project and the county's fire service on College Avenue cannot provide adequate services to the project."

Response:

- A. Fire station and equipment capital costs were based on price information from Broadmoor Development Company and verified with independent County Fire Patrol estimates. These values could be high if used equipment becomes available from fire district consolidations. In either case, these costs would be paid by the developer and will not burden existing fire protection agencies.
- B. Staffing and related salaries are based on county Fire Patrol standards. The staffing level used in the Northbluff Public Services Plan represents the County Fire Patrol staff requirements for a three man engine company. The staffing level used by LAFCO was derived from staffing requirements used in the Castro Valley Fire Protection District.

LAFCO staff uses the staffing and cost standards of Castro Valley Fire Protection District because they provide urban level fire protection. Since Northbluff is an urban type development, their fire protection should be staffed and costed out using an urban fire protection district.

TABLE 4

COUNTY REVENUES LOST AND COST SAVINGS IF ANNEXATION TO LIVERMORE OCCURS

<u>Revenue Taxes Transferred</u>	<u>1983</u>	<u>83-84</u>	<u>84-85</u>	<u>85-86</u>	<u>86-87</u>	<u>87-88</u>
County Property Tax Transferred	\$49,730	\$121,330	\$184,330	\$214,110	\$264,390	\$270,870
Sales Tax	6,620	13,240	19,860	26,480	33,100	39,720
Transfer Tax	32,570	57,190	60,930	45,470	64,110	40,580
Licenses - Fines Court Fees	9,050	23,350	38,790	46,680	60,250	64,780
TOTAL	\$97,970	\$215,110	\$303,910	\$332,740	\$421,850	\$415,950
Cost Savings Sheriff	22,350	57,660	95,800	115,310	148,840	160,000
Net County Loss if Annexation Occurs	\$75,620	\$157,450	\$208,110	\$217,430	\$273,010	\$255,950

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Source: LAFCO Staff Report using revised property tax allocation.

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We have shown in Table 5 the staffing that would occur if Castro Valley Fire Protection District service standards were applied. An interview with the Castro Valley Fire Protection District determined that staffing for a three man engine company would include three captains, three engineers and four fire fighters. The LAFCO analysis included a Deputy Chief and an extra engineer. These additional positions are not included in Table 5.

- C. Salaries, benefits, and supplies were based on information from the County Fire Patrol. Here again, for comparative purposes we have used in Table 5 the cost factors used from the Castro Valley Fire Protection District. The annual fire protection costs in Table 5 are \$77,000 higher than the original report costs. This represents a 27 percent increase in fire cost estimates.

TABLE 5

FIRE PROTECTION COSTS USING CASTRO VALLEY FIRE PROTECTION DISTRICT STAFF REQUIREMENTS AND COSTS (IN 1980 DOLLARS)

<u>Position</u>	<u>Man-Year</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Captains	3.0	\$ 27,156	\$ 81,470
Engineers	3.0	24,144	72,430
Fire Fighters	<u>4.0</u>	<u>22,800</u>	<u>91,200</u>
TOTAL	12.0		\$245,100
Benefits (PERS, medical, insurance, etc.) at 34 percent of salary			83,330
Plus Supply Costs - at 12.2 percent of salary			<u>29,900</u>
TOTAL ONGOING ANNUAL COSTS			\$358,330

One time start up costs (provided by developer)

Land and Station	\$250,000
Pumper	100,000

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D. Phasing of fire protection service was based on the current level of service available from the County Fire Patrol station, eight minutes to the south, and the Insurance Service Office standards. The actual time to build a fire station at Northbluff will be based on a negotiated agreement between the developer and the county. For comparative purposes we have included an analysis of fire costs if the staffing, station and equipment are installed at Northbluff in the second year of the project's development when the project will be 1/3 complete. The annual cost plus the property tax revenue and the special tax contribution requirements are shown in Table 6.

4. Comment: "Police service costs should be revised. Staffing requirement for a 24-hour beat are underestimated and back up costs are not included. Additional consideration is required for problems associated with phasing in of service."

Response:

A. Police service costs of \$160,000 at buildout for the Northbluff Development were based on a detailed interview with the Alameda County Sheriff's Office Chief in charge of sheriff patrol in the unincorporated county areas (12 December 1980 interview with Chief Walker - since retired). The cost calculations resulting from the original interview were used in the Northbluff analysis. These costs have been rechecked by the Sheriff's Office (16 July 1981 interview with Chief Suza, Alameda County sheriff). The results of both interviews noted the following observations.

- Actual patrol time in Northbluff at buildout would be 30 percent to 40 percent of 1 beat.
- Support for unincorporated patrol for administration, investigation, etc. would be in addition to routine patrol.
- Conservative maximum requirement for unincorporated police service would not exceed 1 beat.

TABLE 6
NORTHBLUFF FIRE PROTECTION COSTS AND REVENUES - USING CASTRO VALLEY COST FACTORS
(IN 1980 DOLLARS)

	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>
<u>Ongoing</u>						
Annual Costs (See Table 5)		\$358,330	\$358,330	\$358,330	\$358,330	\$358,330
Revenue: Property Tax	\$ 22,200	53,900	81,460	93,850	115,030	116,370
Annual Surplus (deficit) for Special Tax Contribution	22,200	(282,230)	(276,870)	(264,480)	(243,300)	(241,960)
Annual Fee (per DUE ¹)	-0-	\$157	\$154	\$147	\$135	\$134

¹ "DUE" or "Dwelling Unit Equivalent" is defined as a "single family unit equivalent" - 1,750 residential and 50 commercial - total 1,800 units.

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Based on the results of these interviews it seems unlikely that costs relating to the unincorporated police service would approach the \$266,000 estimate used by LAFCO staff.

- B. Phasing police service costs in during the construction period and through to the buildout of the project is appropriate for the following reasons.
- The Alameda County Sheriff's Office employs a total of 899 patrol and support staff. The addition of 1 or 2 patrol staff in any given year will not create a large increase in costs.
 - The level of patrol required by Northbluff is based on the level of development during the project's buildout. Thus at the end of year 1 when the project is 16 percent complete, it will receive 16 percent of the estimated service requirement costs.
5. Comment: "Additional clarification or aspects of the project to be paid for by the developer is required. When it is indicated that unoccupied building sites would pay a service fee, is it intended that the fee be collected based on all proposed lots in the Northbluff Development, or only those lots created by filing final maps? Who will pay one time costs for the fire station and equipment?"
- Response:
- A. Fee collections for service are based on all proposed lots in Northbluff, not on the potential number of units generated from final map applications.
- B. One time capital costs for the fire station and equipment would be paid by the developer.
- C. Our original analysis proposed a tax or fee payment of all building sites both occupied and vacant for fire protection and standby sanitation costs. The per parcel cost is based on the number of parcels

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specified in the project description (1,750 units) plus an equivalent factor for commercial property for an additional 50 units.

This was derived from the Land Use and Development Plan submitted by Broadmoor to the County for a zone change at Northbluff. The actual number of units that would be specified in filing of final maps will not occur until the project is approved and filing begins.

6. Comment: "Regional Water Quality Control Board raised questions on costs of sewage treatment which should be answered."

Response: The Regional Water Quality Control Board raised the following questions. The answer is shown below each question.

- (1) Were replacement costs taken into account as part of the sewer operating costs?

Answer: Yes

- (2) Were administrative costs for billings, etc. included in the personnel and other costs under fixed costs?

Answer: Administrative cost - yes; billing costs - no.

- (3) Will the homeowners association be required to cover the costs associated with crop management and harvesting? Correct crop management is essential to proper functioning of the complete disposal process and must be under the jurisdiction of the CSA. It may also be costly and beyond the financial and technical resources of a homeowners association.

Answer: Homeowners will not be required to pay for crop management and harvesting. The irrigated open space would most likely be owned by the CSA and leased out for grazing. This would accomplish two objectives. First, it would insure that the property had an erosion resistant grass crop and secondly, it would provide a small revenue for the CSA managing the sanitation disposal system.

- (4) If crop management has not been included in the open space maintenance responsibilities of the homeowners association, have the costs associated with it been included in the fixed or operating costs of the sewer service?
- (5) Additional costs to residents, such as open space maintenance, should be quantified and noted in the report. Although not costs to government, they aid in more closely reflecting the true costs of the project.

The answer to these two questions is covered in the response to question number 3.

7. Comment: "All costs to future residents of the project should be quantified including property taxes, special taxes, CSA costs, and homeowners association fees so that decision makers would be aware of total projected financial obligations of future residents in the development."

Response: Table 7 indicates the breakdown of taxes and fees that each dwelling unit would pay. It should be noted that these figures represent an average incident of taxes and fees and that the actual tax will vary on the house (for property tax) and the level of recreation support available to the various types of residences. This means that an owner of a single family detached home would pay a higher property tax than an owner of a townhouse because the property value is higher.

- Property taxes will depend on the sale value of the property. Single family homes will sell for more than the condominiums and townhouse units. Thus single family units will pay a higher property tax.
- Water fees will depend on the level of usage. Single family units with extensive landscaping will have a higher water bill than a condominium without landscaping.
- Sanitation fees are based on operation, maintenance, and replacement costs for the on site sanitation facility.

TABLE 7

ESTIMATE OF TAXES AND FEES PAID BY RESIDENTIAL
HOMEOWNERS AT PROJECT BUILDOUT

(IN 1980 DOLLARS)

<u>Type of Tax</u>	<u>Total Contribution</u>	<u>Tax per Dwelling (÷ 1,750 units)</u>
Property tax		
All jurisdictions	\$1,657,040	\$947
Water fees	245,000	140
Sanitation fees	292,250	167 ¹
Solid waste	105,000	60
Fire protection special tax	234,500	134
Homeowners asso- ciation - common area maintenance plus pool and recreation	2,100,000	1,200 ²
	<hr/>	<hr/>
TOTAL	\$4,633,790	\$2,648

¹If tertiary treatment of sewage is necessary, the annual sanitation fees would be an estimated \$420.

²Homeowner fees could vary from \$300 annually for median strip maintenance to \$1,500 annually to include building, grounds, pool, and recreation maintenance.

Mr. Adolph Martinelli
August 12, 1981
page sixteen

APPENDIX E

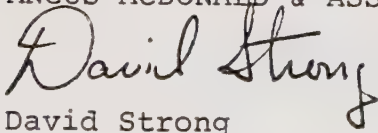
- Solid waste fees represent the cost of garbage collection.
- Fire protection costs are derived from Table 6.
- Homeowner association fees are based on three levels of homeowner requirements. The least expensive would cover the costs of median maintenance and possibly some common area maintenance at a cost of approximately \$300 annually. The second level would add the cost of maintaining a recreation facility and swimming pool for an additional \$800 or \$900 per year. The third level would be required by condominium owners for common wall, roof, and grounds maintenance for a total cost of approximately \$1,500 annually.

8. Comment: "Discussion of alternatives should be expanded. A revenue/cost analysis should be completed for development of the project in the City of Livermore. Comparison of revenue/cost balances between the city and the unincorporated area development would be extremely helpful in determining relative feasibility of the project. It also may influence the city to change its policy toward residential development of the site. A brief discussion of fiscal advantages/disadvantages of industrial development of the site should be prepared since this is the most likely alternative land use."

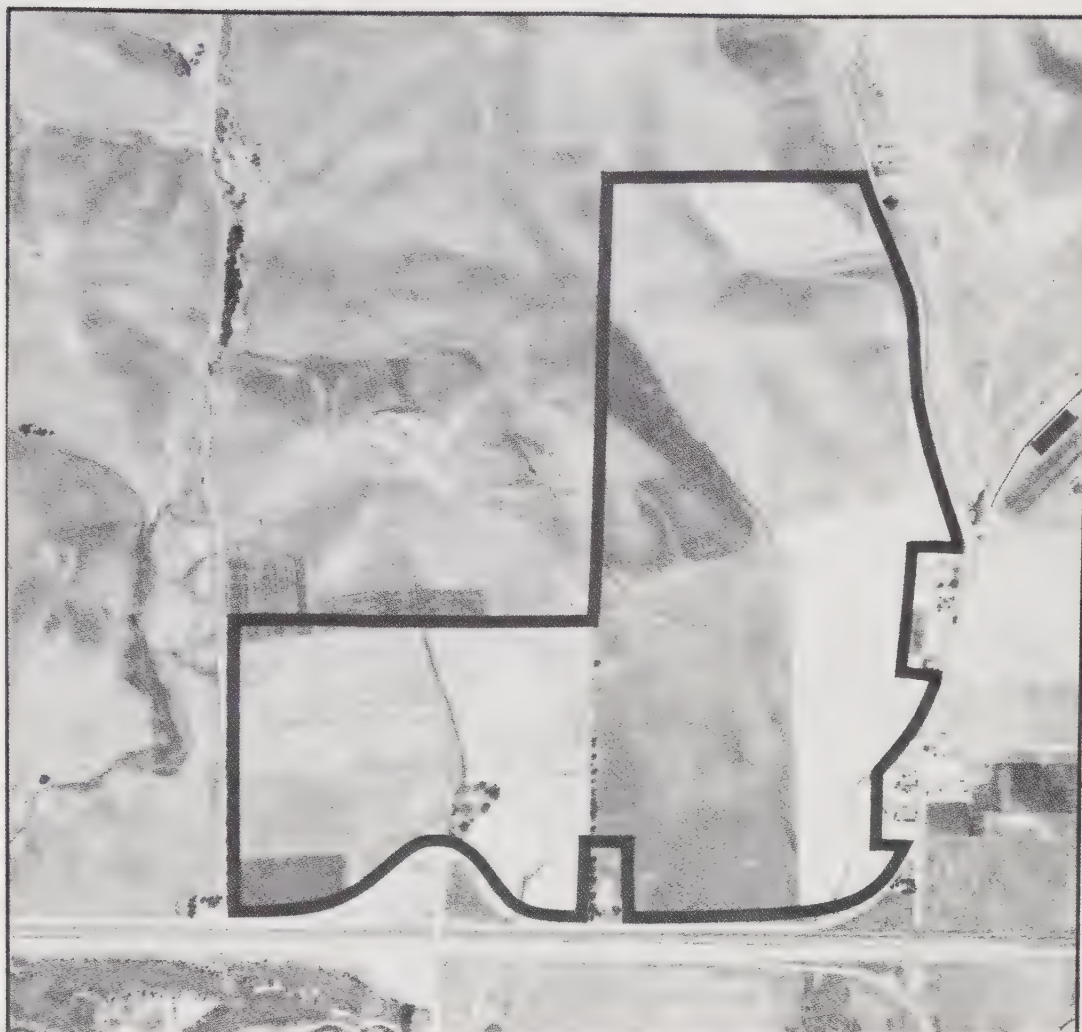
Response: An analysis of the cost/revenue impacts on the City of Livermore if Northbluff is annexed into the city is underway and will be available in late September or early October. The annexation analysis will also include an analysis of the industrial development potential for the site.

Yours very truly,

ANGUS McDONALD & ASSOCIATES, INC.


David Strong

DS/b1



NORTHBLUFF
DEVELOPMENT

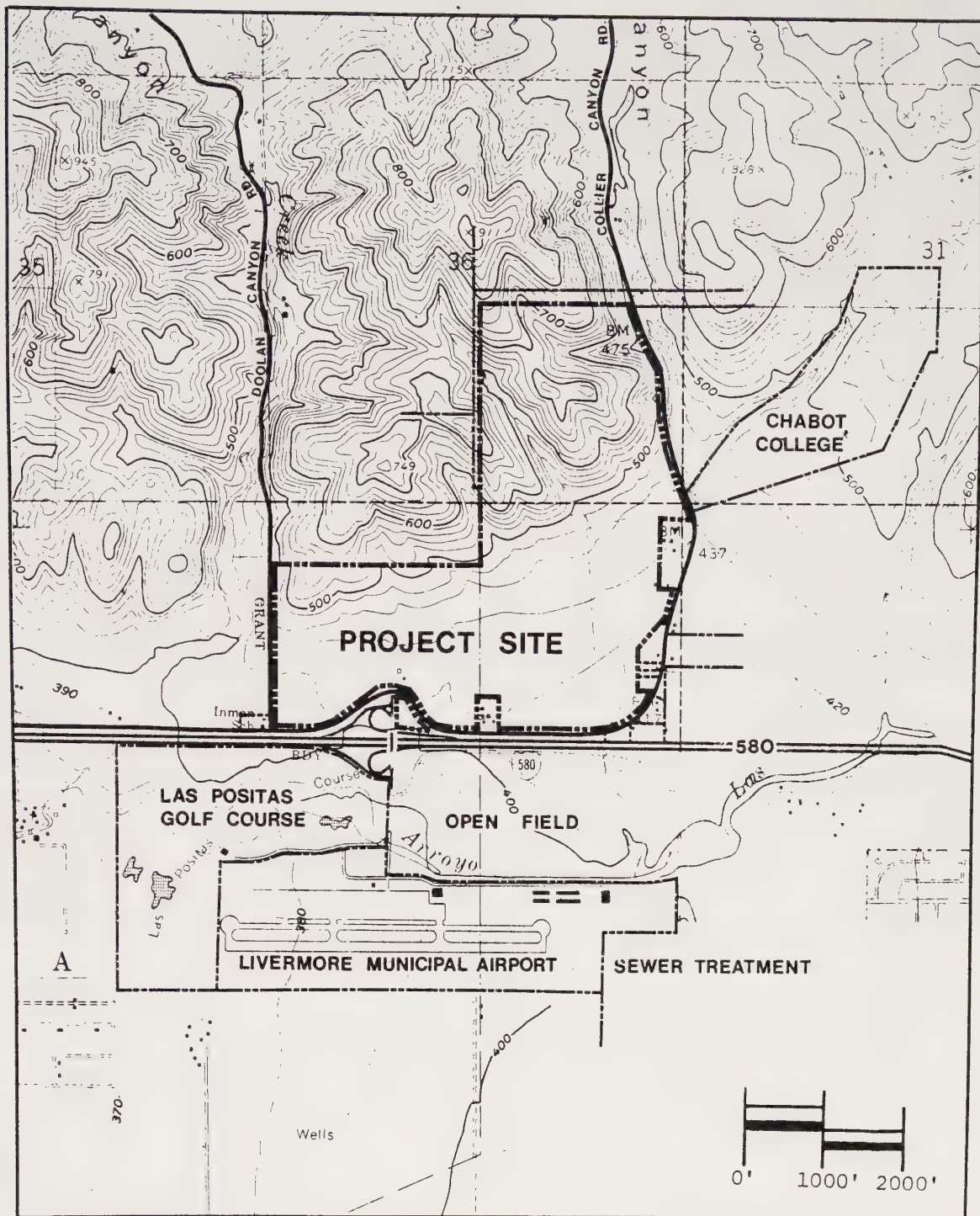


no scale

Aerial Photo
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

FIGURE 1



NORTHBLUFF DEVELOPMENT

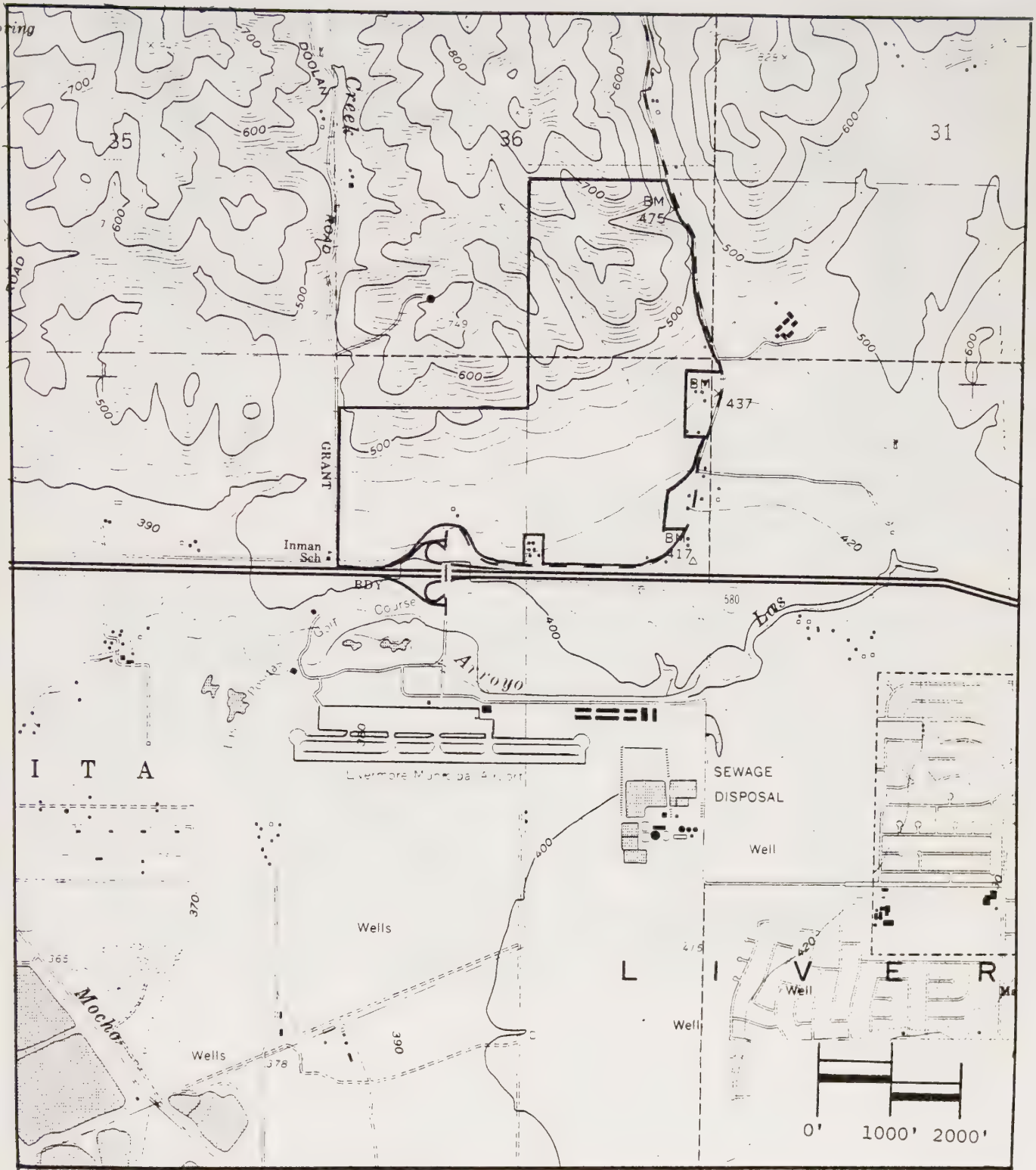
November, 1981



VICINITY MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 2



NORTHBLUFF DEVELOPMENT



AREA MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

FIGURE 3

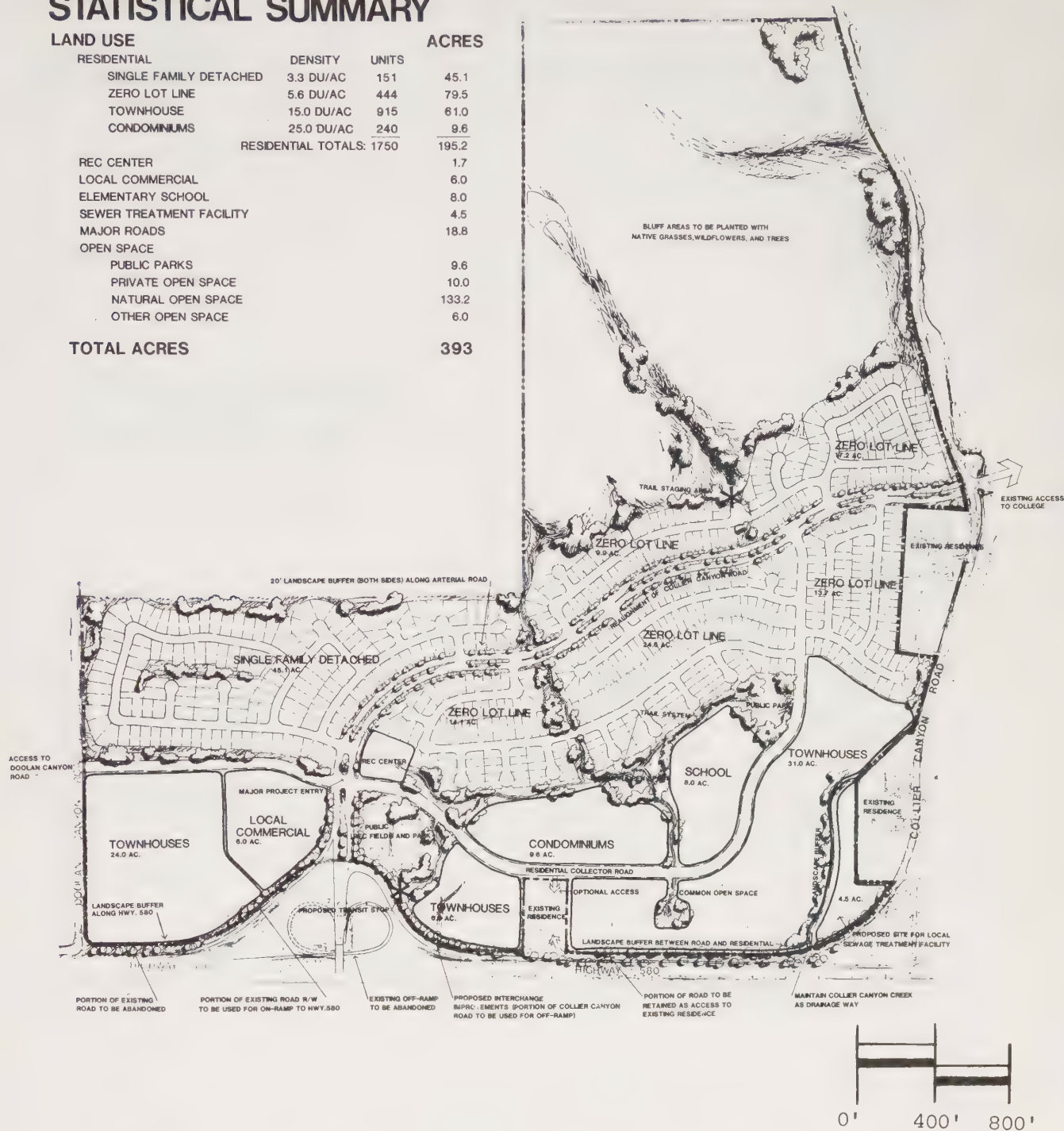
STATISTICAL SUMMARY

LAND USE

RESIDENTIAL	DENSITY	UNITS	ACRES
SINGLE FAMILY DETACHED	3.3 DU/AC	151	45.1
ZERO LOT LINE	5.6 DU/AC	444	79.5
TOWNHOUSE	15.0 DU/AC	915	61.0
CONDOMINIUMS	25.0 DU/AC	240	9.6
RESIDENTIAL TOTALS: 1750			195.2
REC CENTER			1.7
LOCAL COMMERCIAL			6.0
ELEMENTARY SCHOOL			8.0
SEWER TREATMENT FACILITY			4.5
MAJOR ROADS			18.8
OPEN SPACE			
PUBLIC PARKS			9.6
PRIVATE OPEN SPACE			10.0
NATURAL OPEN SPACE			133.2
OTHER OPEN SPACE			6.0

TOTAL ACRES

393



**NORTHBLUFF
DEVELOPMENT**



**SITE PLAN
ALAMEDA COUNTY
PLANNING DEPARTMENT**

November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

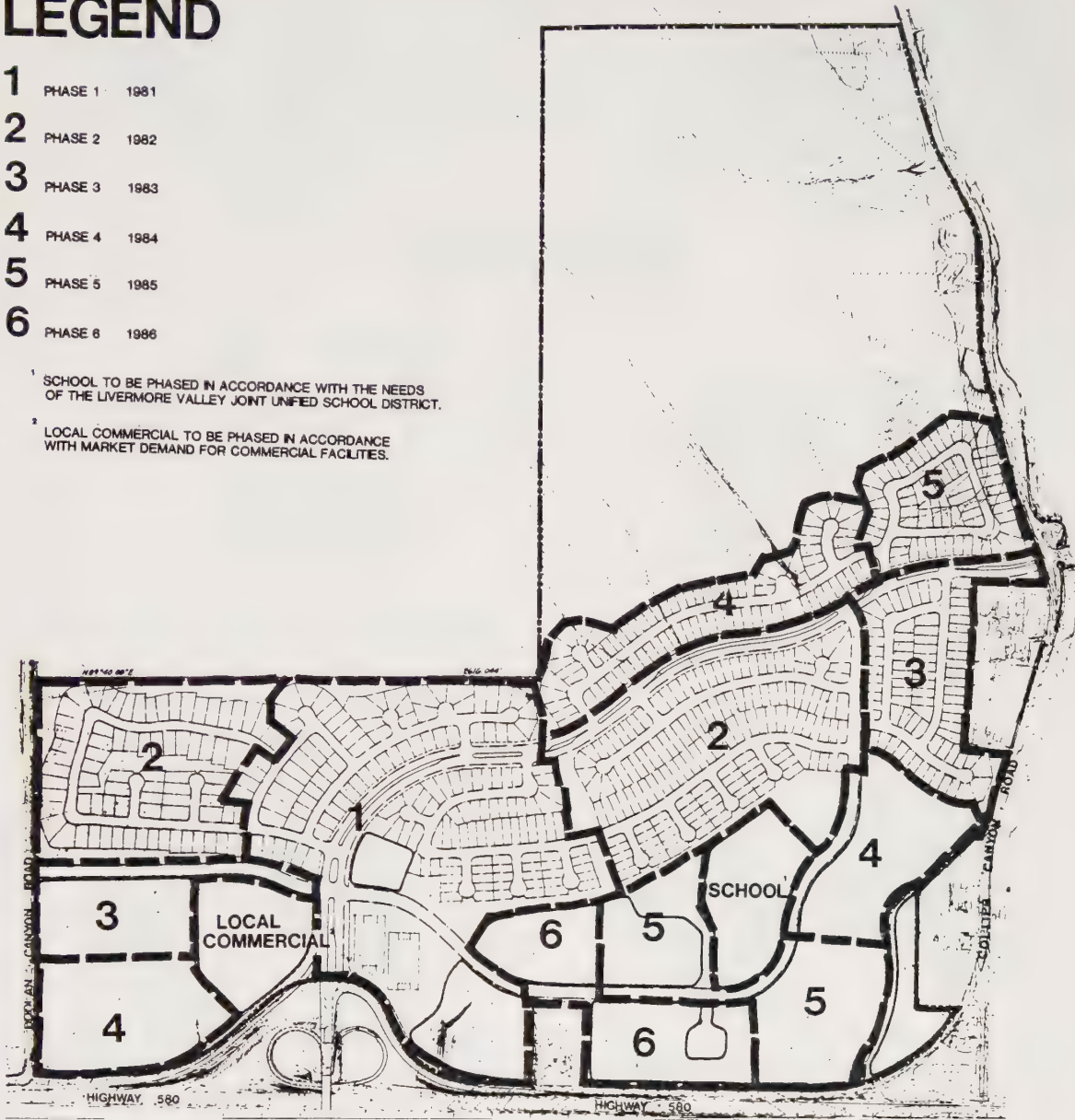
FIGURE 4

LEGEND

- 1 PHASE 1 1981
- 2 PHASE 2 1982
- 3 PHASE 3 1983
- 4 PHASE 4 1984
- 5 PHASE 5 1985
- 6 PHASE 6 1986

¹ SCHOOL TO BE PHASED IN ACCORDANCE WITH THE NEEDS OF THE LIVERMORE VALLEY JOINT UNIFIED SCHOOL DISTRICT.

² LOCAL COMMERCIAL TO BE PHASED IN ACCORDANCE WITH MARKET DEMAND FOR COMMERCIAL FACILITIES.



NORTHBLUFF
DEVELOPMENT

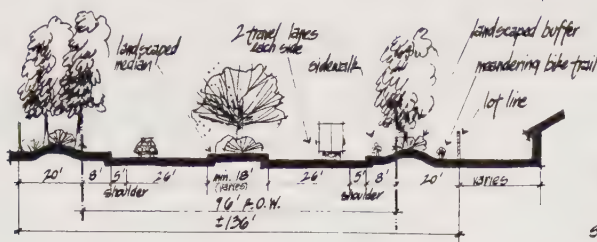


PHASING
ALAMEDA COUNTY
PLANNING DEPARTMENT

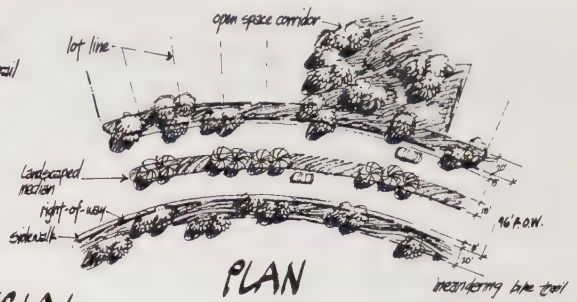
November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 5

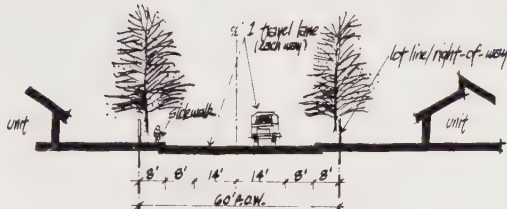


SECTION

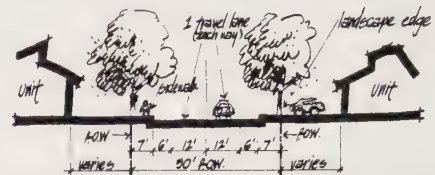


PLAN

MAIN ARTERIAL (COLLIER CANYON RD.)

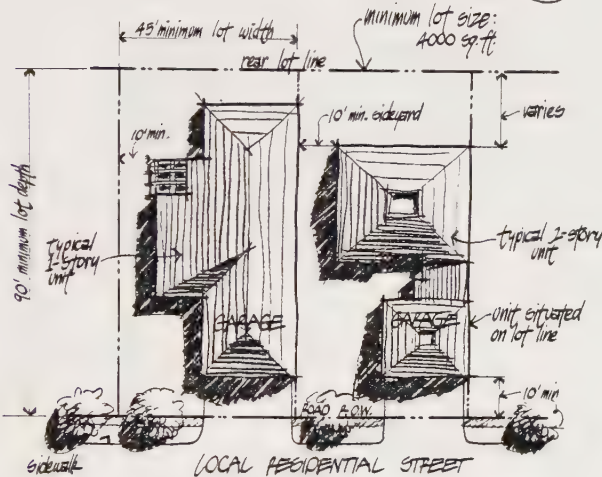


COLLECTOR

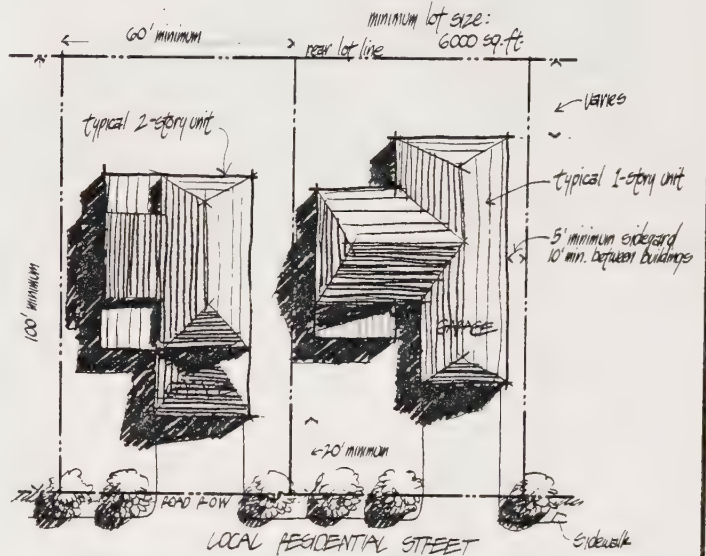


LOCAL RESIDENTIAL

UNITS/LOTS



ZERO LOT LINE UNIT



STANDARD SINGLE FAMILY UNIT

NORTHBLUFF
DEVELOPMENT



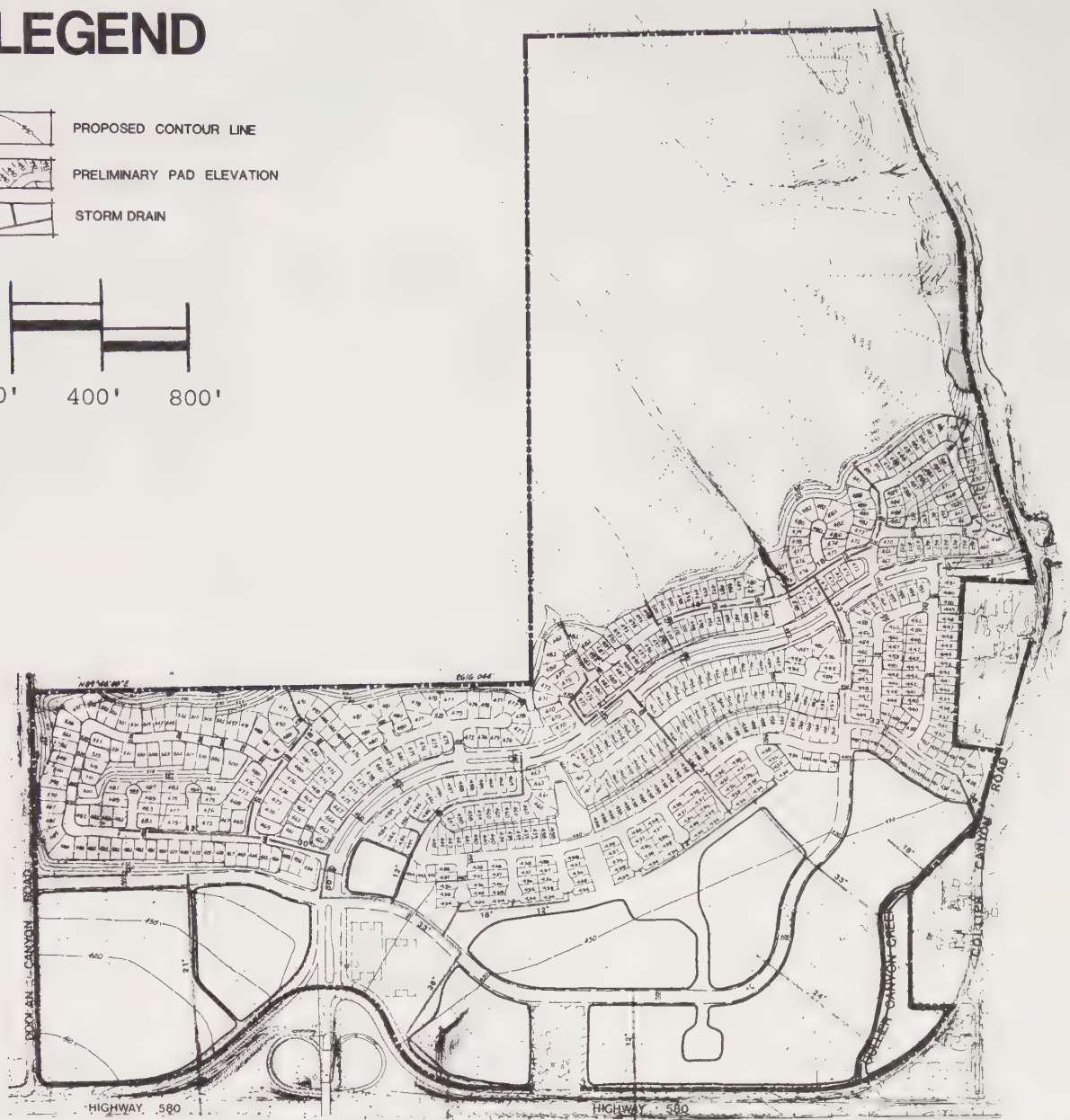
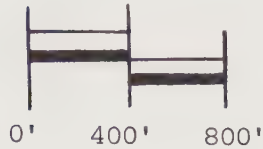
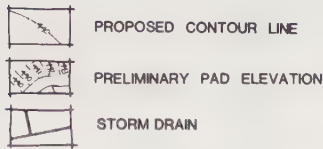
ROAD SECTIONS
& UNIT LAYOUT

ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

LEGEND



NORTHBLUFF
DEVELOPMENT



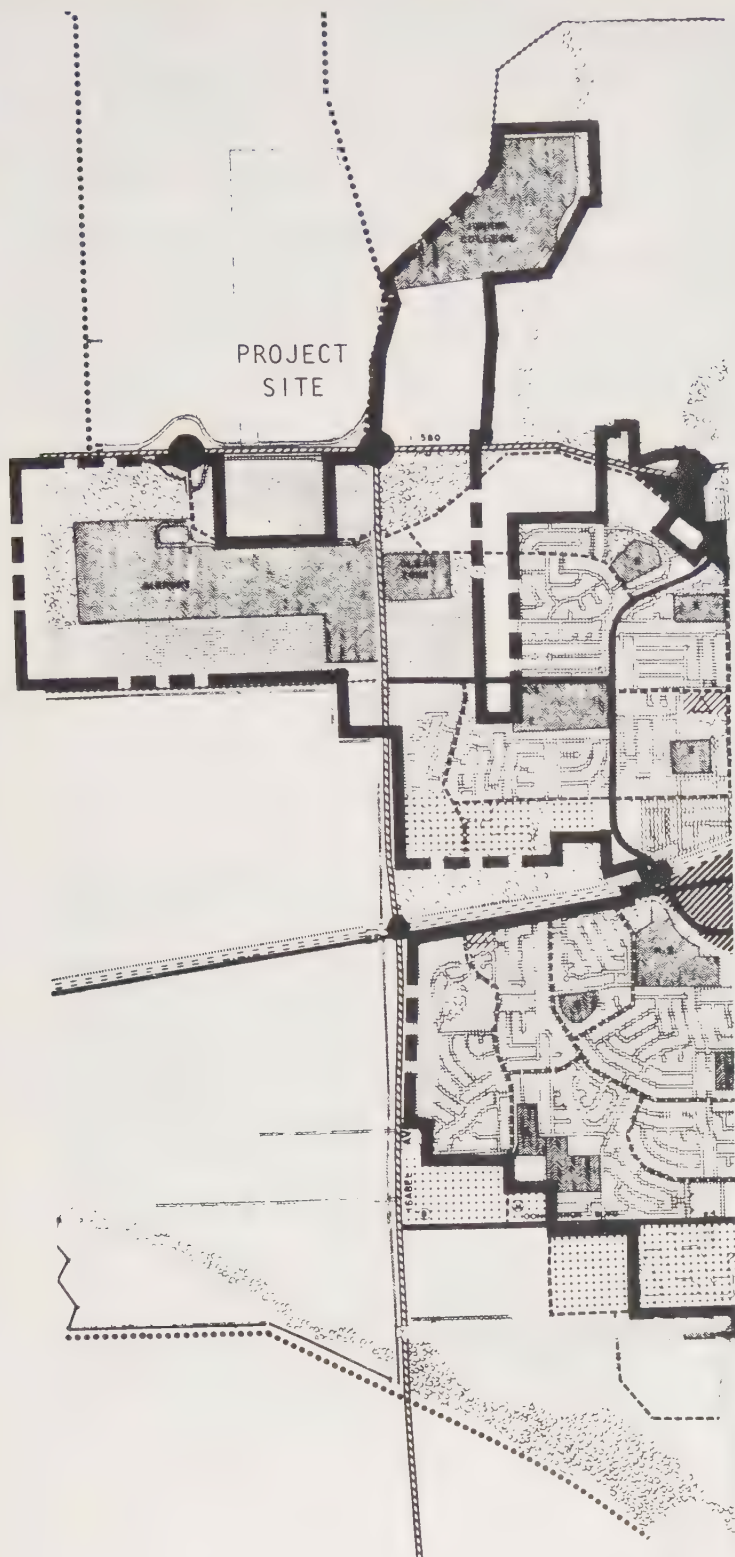
GRADING
& DRAINAGE

ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 7



RESIDENTIAL

- RURAL
1 ACRE MINIMUM SITE
- URBAN LOW
15 D.U./A.C. AVERAGE DENSITY
- URBAN LOW MEDIUM
30 D.U./A.C. AVERAGE DENSITY
- URBAN MEDIUM
45 D.U./A.C. AVERAGE DENSITY
- URBAN MEDIUM HIGH \odot
60 D.U./A.C. AVERAGE DENSITY
- URBAN HIGH
8-18 D.U./A.C. (OR LESS)

COMMERCIAL

- SEE CENTRAL AREA ELEMENT
- NEIGHBORHOOD COMMERCIAL
- SERVICE COMMERCIAL
- HIGHWAY COMMERCIAL
- OFFICE COMMERCIAL

COMMUNITY FACILITIES

- ELEMENTARY SCHOOL K-6
- INTERMEDIATE SCHOOL 7-8
- HIGH SCHOOL 9-12
- POST OFFICE
- FIRE STATION
- HOSPITAL
- CIVIC CENTER
- CEMETARY

OPEN SPACE

- PARKS, TRAILWAYS, AND RECREATION, CORRIDOR, AND PROTECTED AREAS
- LIMITED AGRICULTURE
20 ACRE MINIMUM SITE
- VITICULTURE
100 ACRE MINIMUM SITE
- GENERAL AGRICULTURE
100 ACRE MINIMUM SITE
- RANGE AND GRASSLAND
100 ACRE MINIMUM SITE
- SAND AND GRAVEL RESOURCES

INDUSTRIAL

- LOW INTENSITY INDUSTRIAL
- HIGH INTENSITY INDUSTRIAL

CIRCULATION

- HIGHWAY
- MAJOR STREET
- COLLECTOR STREET
- MAJOR RURAL ROAD
- RAILROAD
- RAPID TRANSIT LINE
- GRADE SEPARATION
- INTERCHANGE

1" = 4000'



NORTHBLUFF
DEVELOPMENT

November, 1981





GENERAL PLAN
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 8

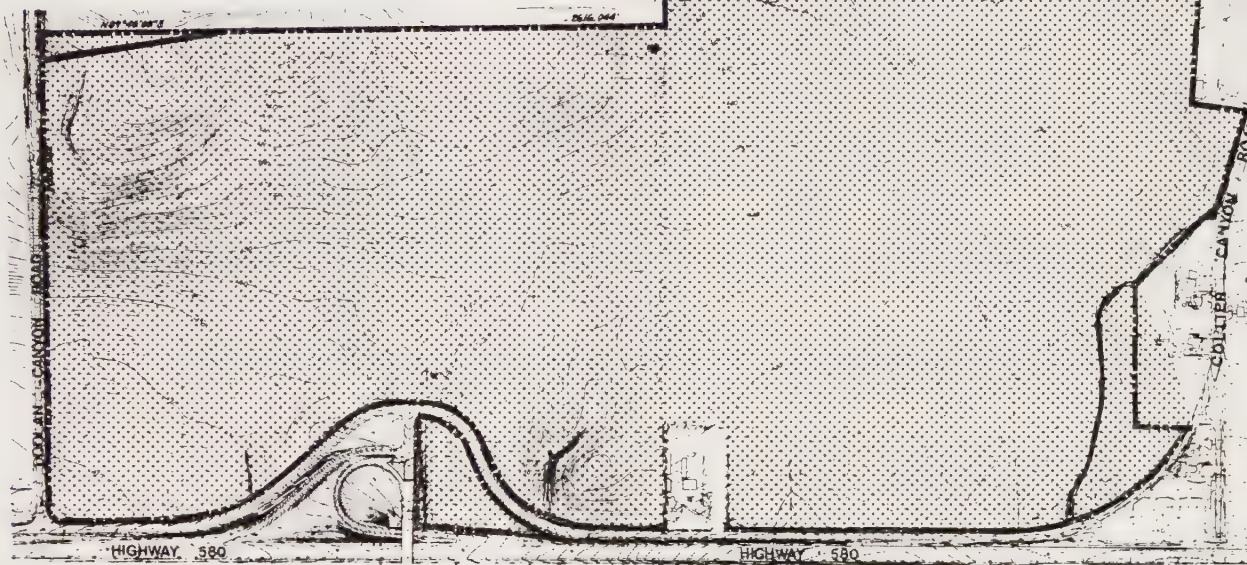
LEGEND

GENERAL PLAN

		ACRES	UNITS
	SUBURBAN RESIDENTIAL 1.0 - 3.5 DU/AC	133	133-466
	LOW RESIDENTIAL 3.6 - 6.6 DU/AC	267	961-1762
	TOTAL	400	1094-2228 mid-range 1661

ZONING

THE ENTIRE SITE IS ZONED
A - AGRICULTURE



NORTHBLUFF
DEVELOPMENT

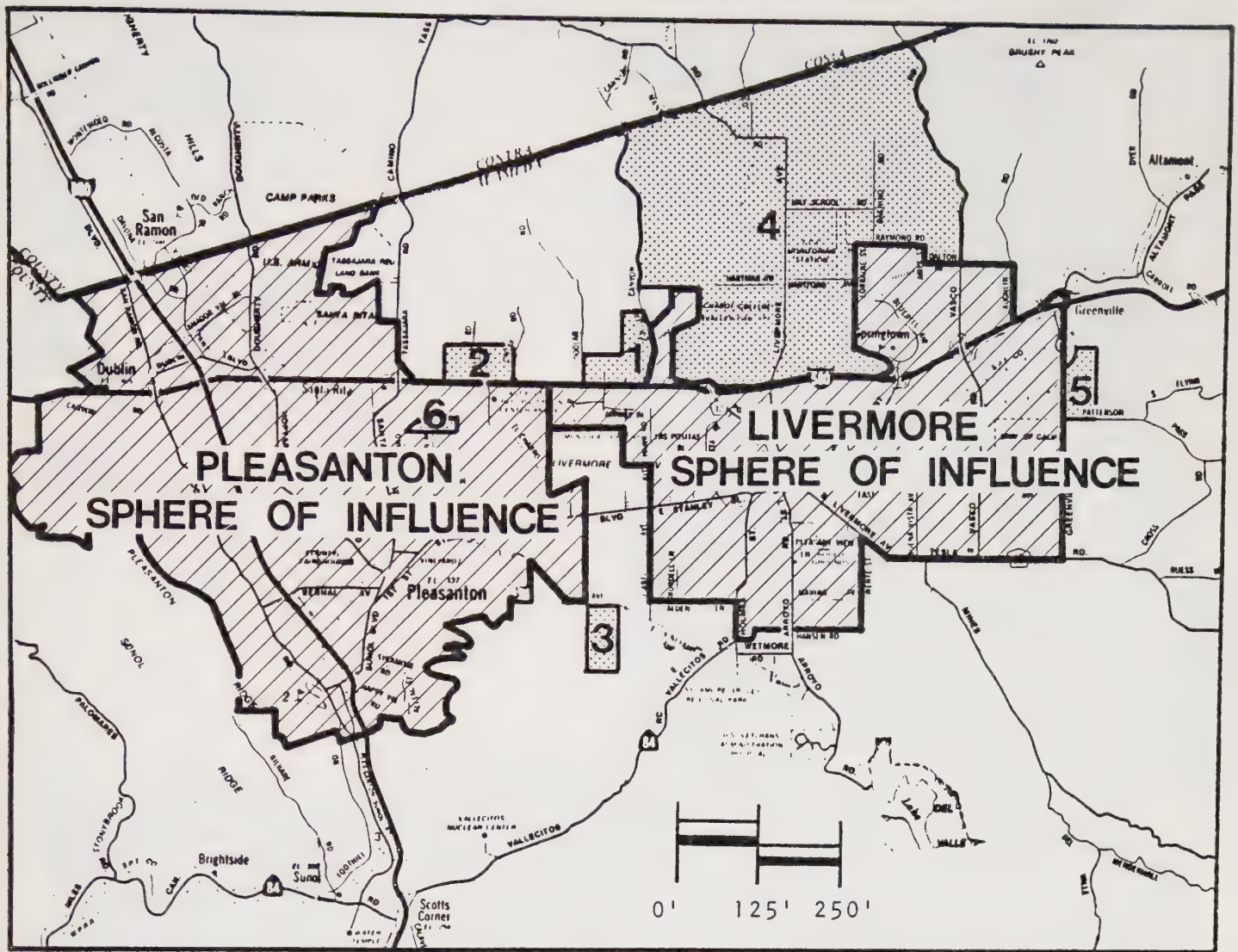


GENERAL PLAN
& ZONING
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 9



Potential Development Areas Requesting CSA's

- | | |
|-----------------------------|----------------------------|
| 1. Northbluff (Broadmore) | 4. Las Positas |
| 2. Croak-Fallon Properties | 5. Richard Doty Properties |
| 3. Ruby Hill (SP-Rajkovski) | 6. Jordan Group (Thorpe) |

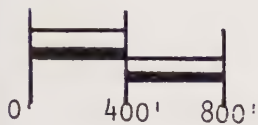
NORTHBLUFF
DEVELOPMENT



SPHERE of
INFLUENCE MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

LEGEND



NORTHBLUFF
DEVELOPMENT

November, 1981

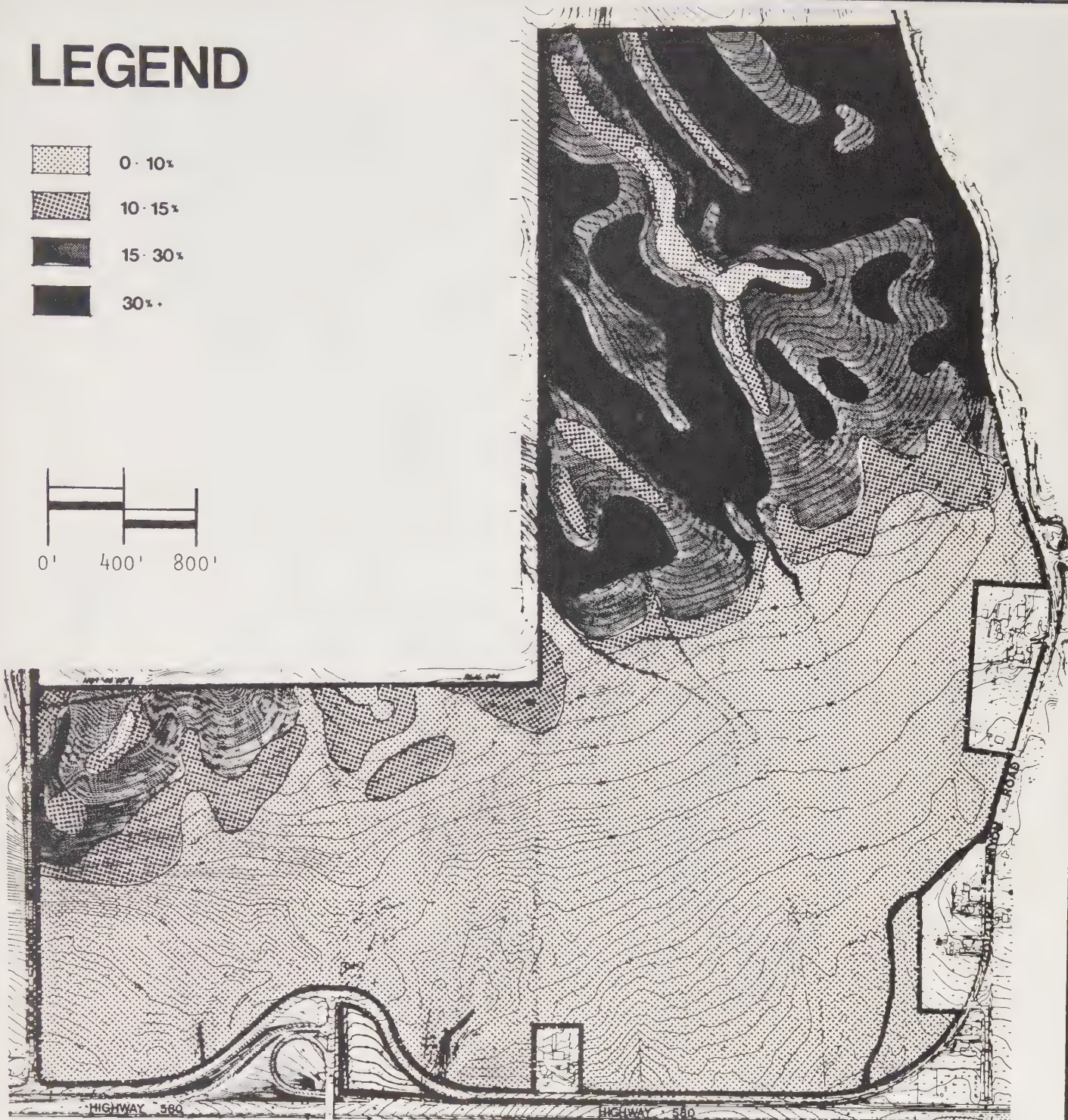
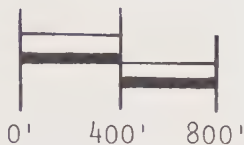
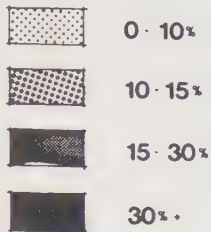


ELEVATION
ALAMEDA COUNTY
PLANNING DEPARTMENT

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 11

LEGEND



NORTHBLUFF
DEVELOPMENT

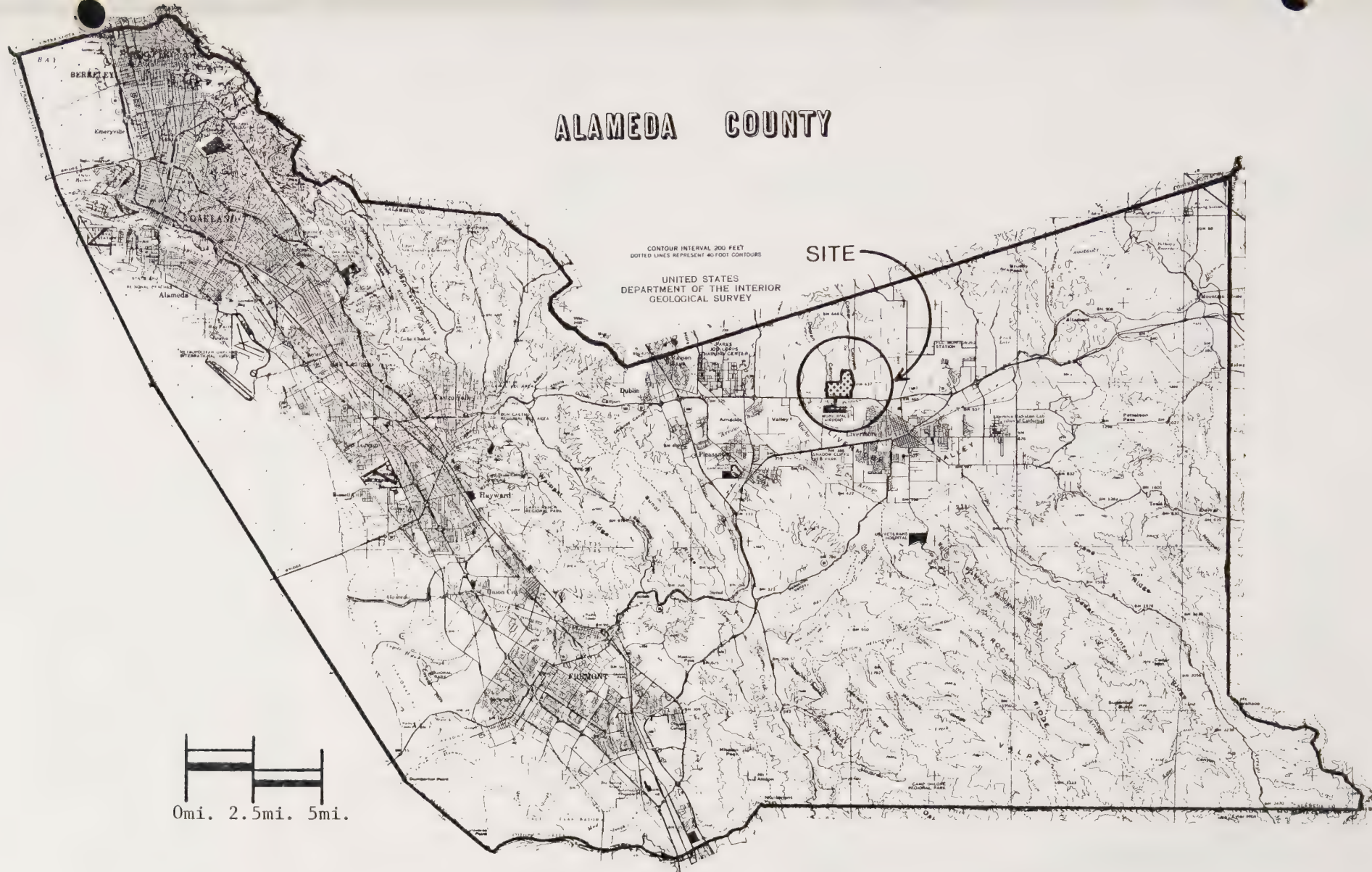


SLOPE MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

SOURCE: PHILLIPS, BRANDT & REDDICK

FIGURE 12



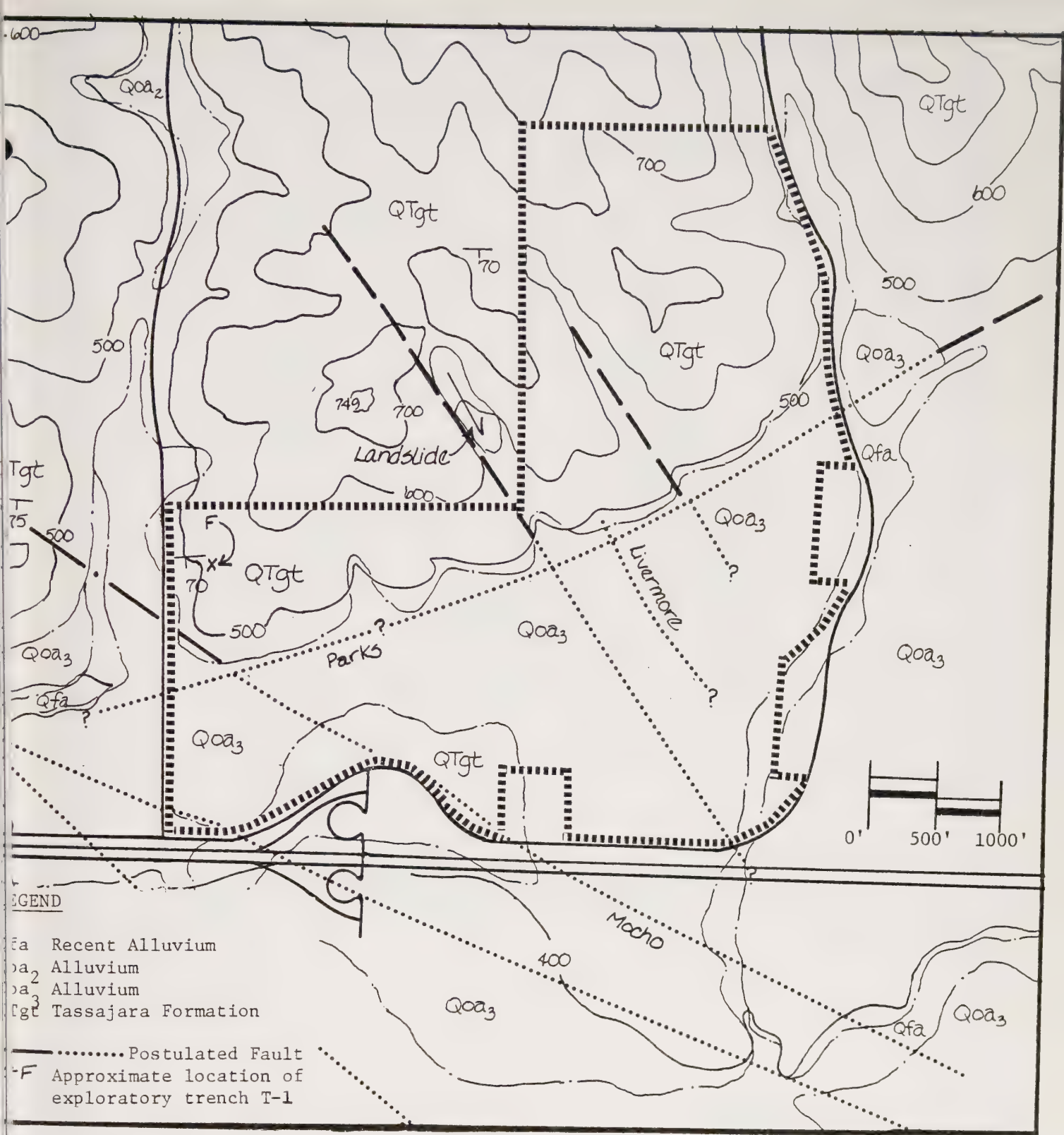
NORTHBLUFF
DEVELOPMENT

November, 1981



REGIONAL MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 13



NORTHBLUFF DEVELOPMENT

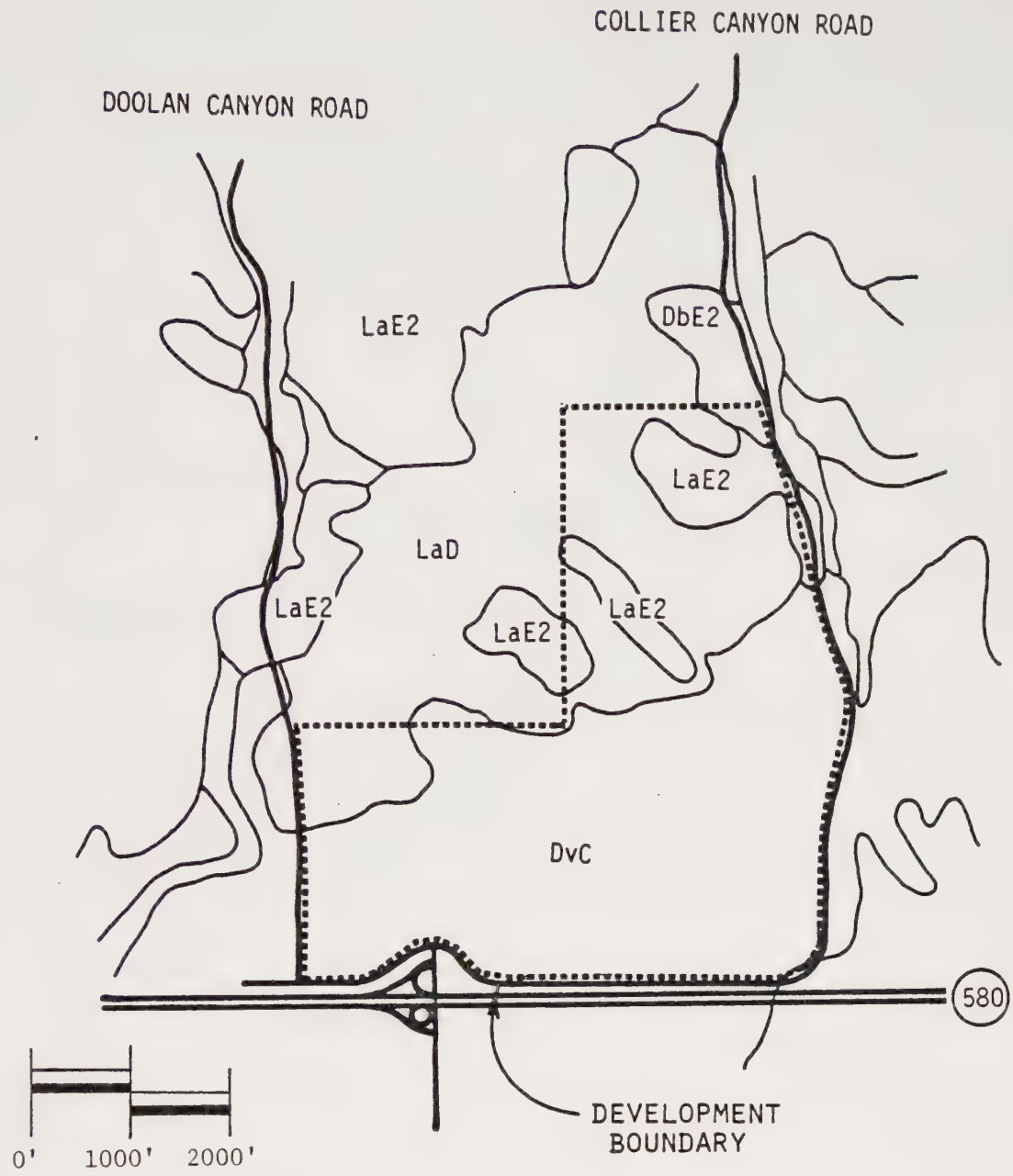


GEOLOGIC MAP ALAMEDA COUNTY PLANNING DEPARTMENT

November, 1981

SOURCE: D.W. CARPENTER, ENGINEERING GEOLOGIST

FIGURE 14



LEGEND

		<u>Capability</u>
DvC	Diablo clay, very deep, 3-15% slope	IIIe-5
DbE2	Diablo clay, eroded, 30-40% slope	VIe-5
LaD	Linne clay loam, 15-30% slope	IVe-5
LaE2	Linne clay loam, 30-45% slope	VIe-5

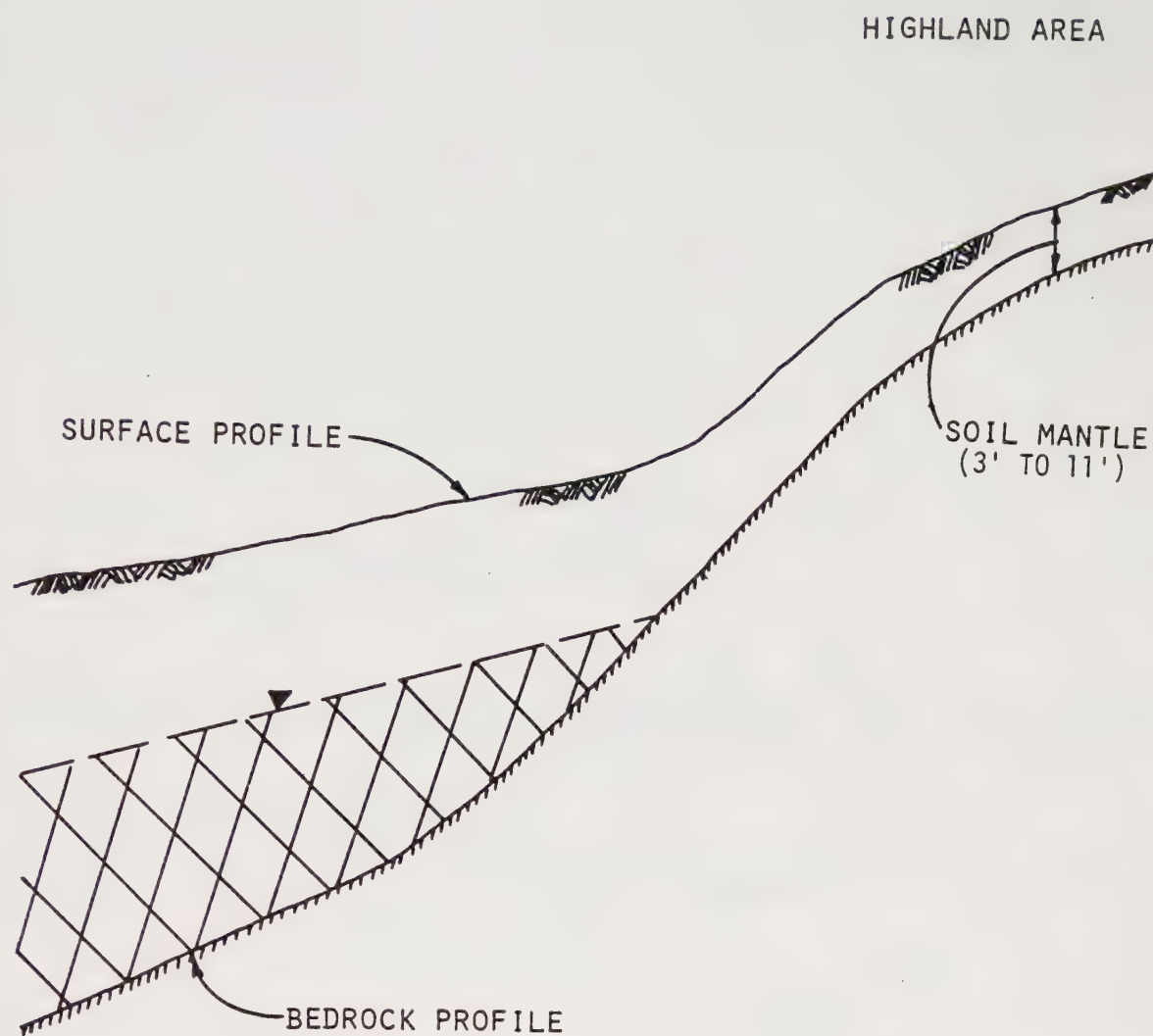
NORTHBLUFF
DEVELOPMENT



SOILS MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

FIGURE 15



NORTHBLUFF
DEVELOPMENT

November, 1981

SOIL PROFILE

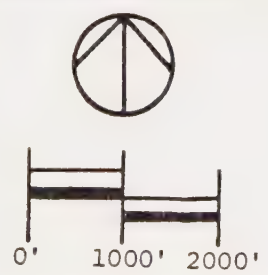
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 16



NORTHBLUFF
DEVELOPMENT

November, 1981



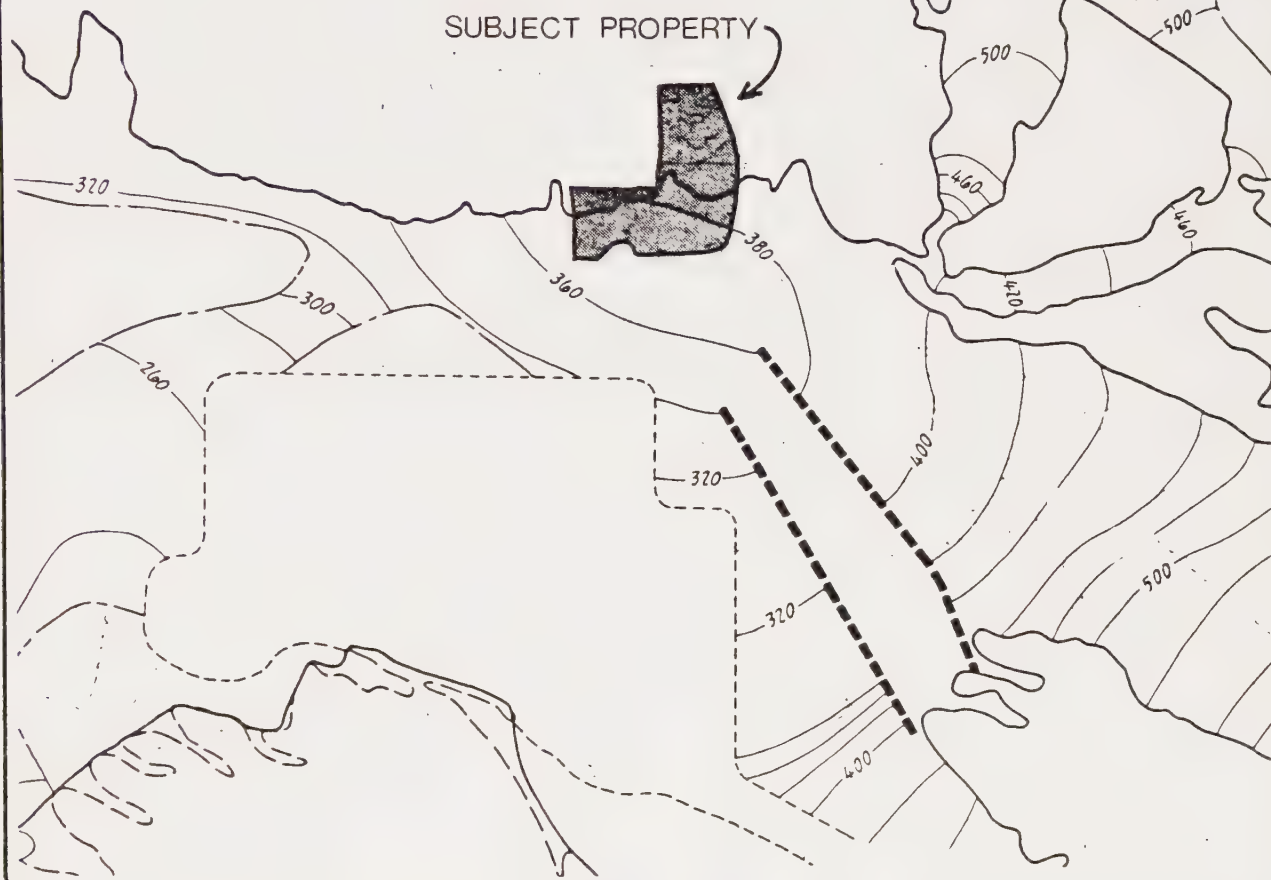
GROUNDWATER
INFORMATION MAP
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 17

LEGEND

SOURCE: Lowry and Associates

- BOUNDARY OF WATER-BEARING AREA
- 500— GROUNDWATER LEVEL CONTOUR, ELEVATION SHOWN IN FEET, CONTOUR INTERVAL 20' - DASHED LINE REPRESENTS HALF INTERVAL CONTOURS.
- - - - QUARRY AREA BOUNDARY
- - - - APPARENT GROUNDWATER BARRIER



NORTHBLUFF
DEVELOPMENT

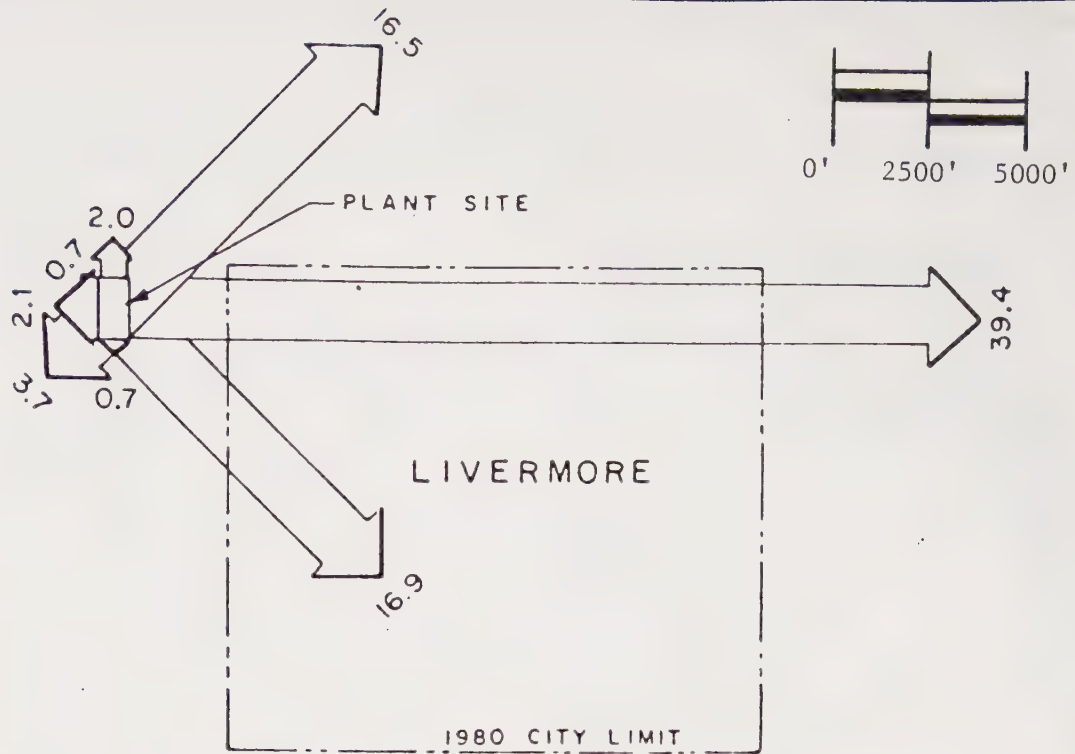


NO SCALE

GROUND WATER
LEVELS
ALAMEDA COUNTY
PLANNING DEPARTMENT

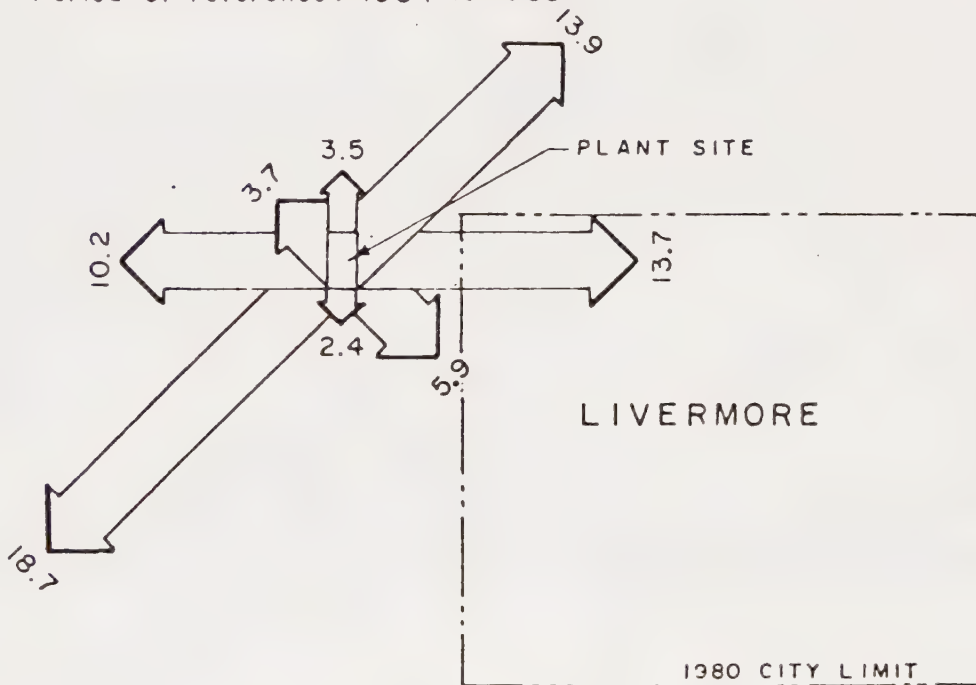
November, 1981

FIGURE 18



APRIL TO SEPTEMBER

Figures are percent of time wind blew in indicated direction.
Period of reference: 1934 to 1938.



OCTOBER TO MARCH

NORTHBLUFF
DEVELOPMENT



WIND DIRECTION
ANALYSIS










ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981



CIRCULATION

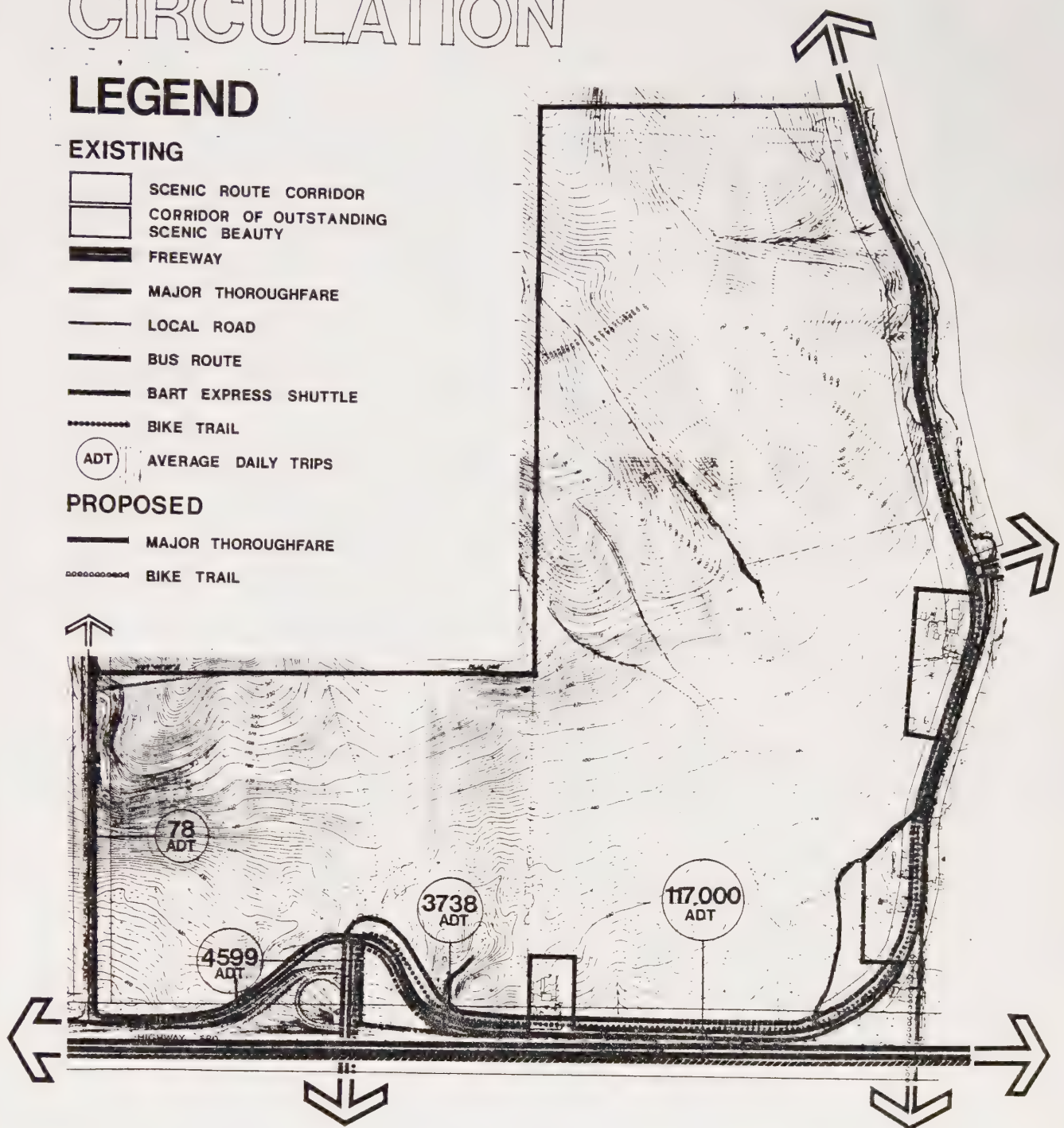
LEGEND

EXISTING

-  SCENIC ROUTE CORRIDOR
-  CORRIDOR OF OUTSTANDING SCENIC BEAUTY
-  FREEWAY
-  MAJOR THOROUGHFARE
-  LOCAL ROAD
-  BUS ROUTE
-  BART EXPRESS SHUTTLE
-  BIKE TRAIL
-  AVERAGE DAILY TRIPS

PROPOSED

-  MAJOR THOROUGHFARE
-  BIKE TRAIL



NORTHBLUFF
DEVELOPMENT

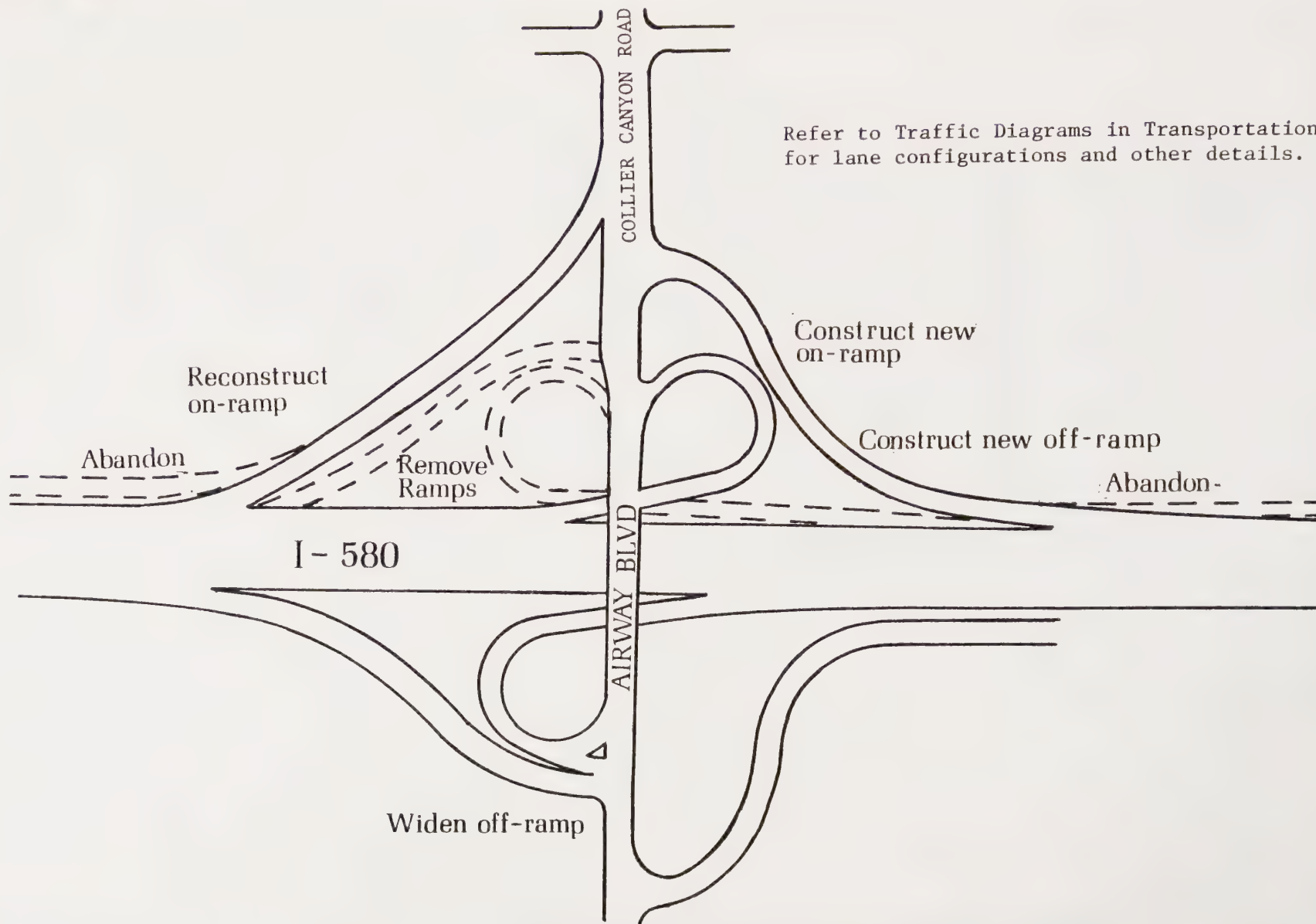
November, 1981



Circulation

ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 20



NORTHBLUFF
DEVELOPMENT

November, 1981



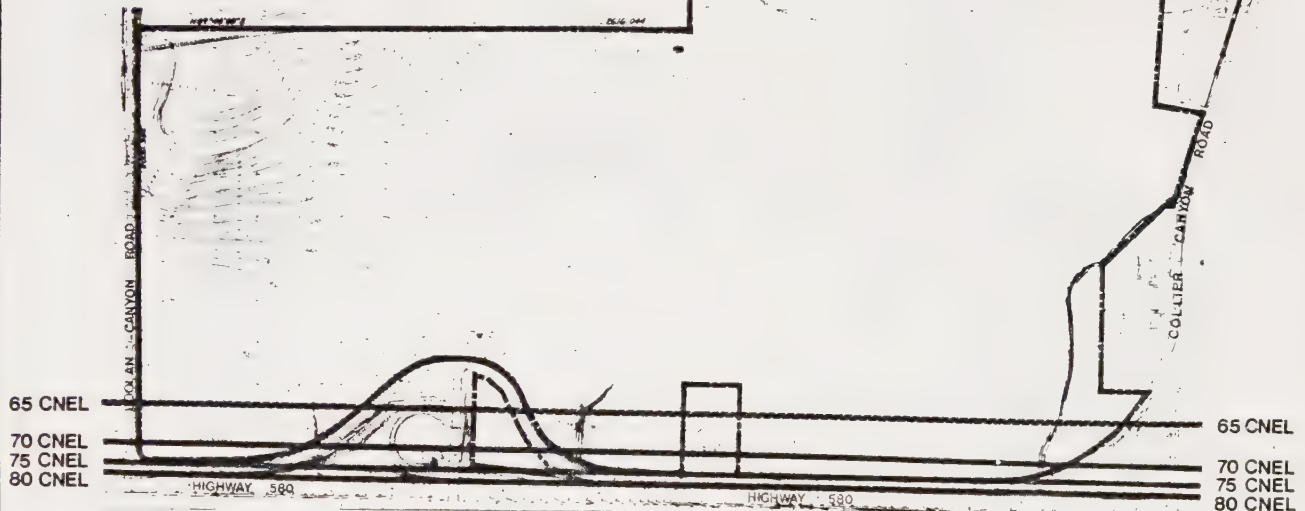
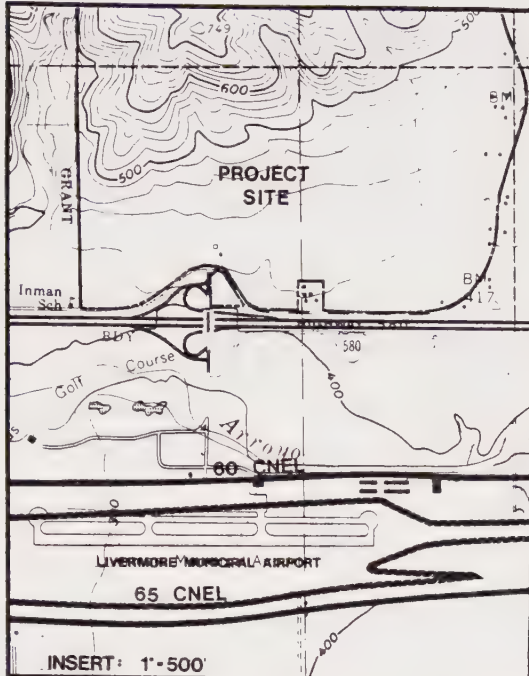
no scale

Proposed I-580
Interchange
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 21

NOISE CONTOURS

AIRPORT RELATED



FREEWAY RELATED

NORTHBLUFF
DEVELOPMENT

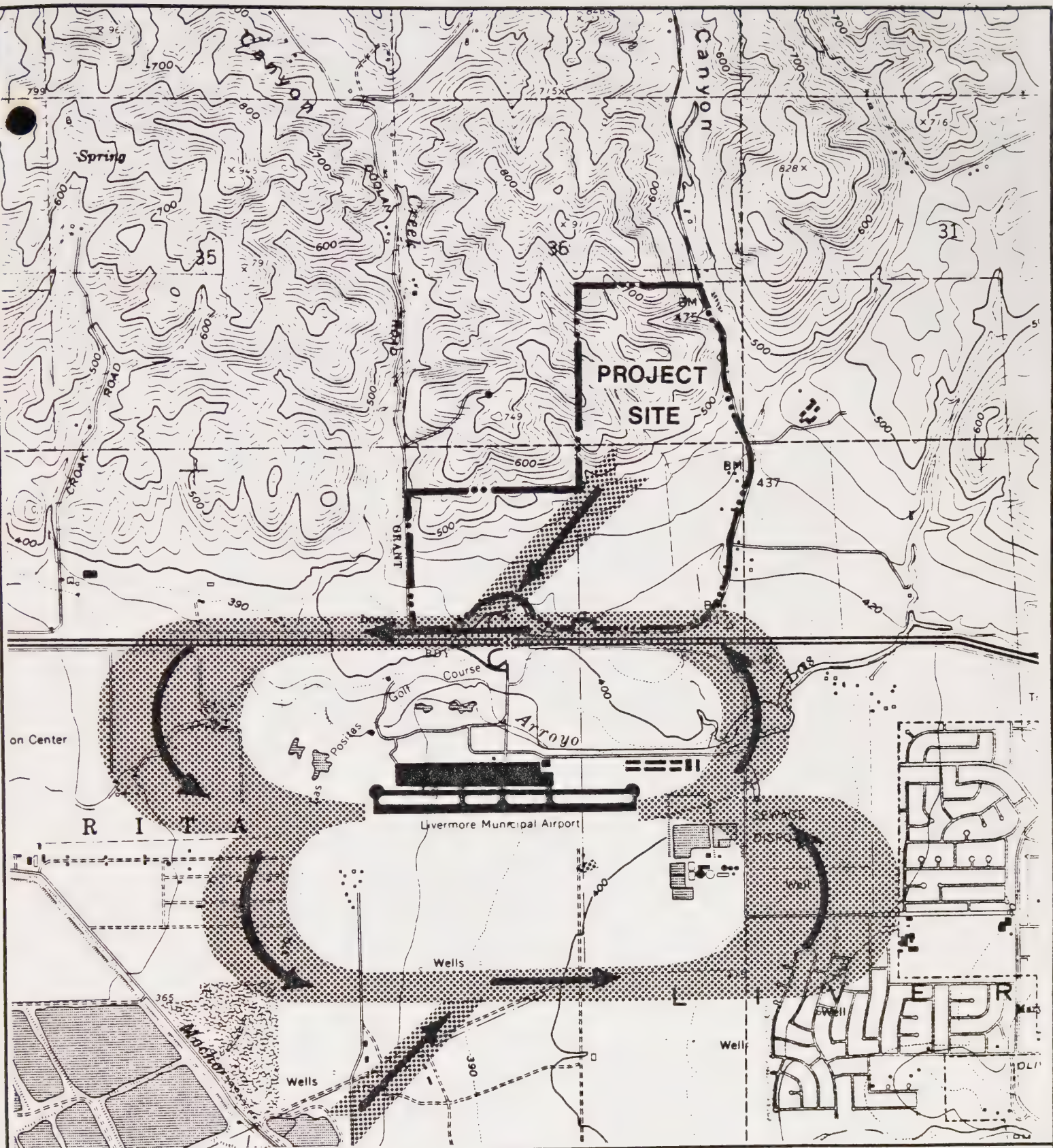
November, 1981



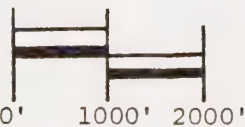
Noise Contours

ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 22



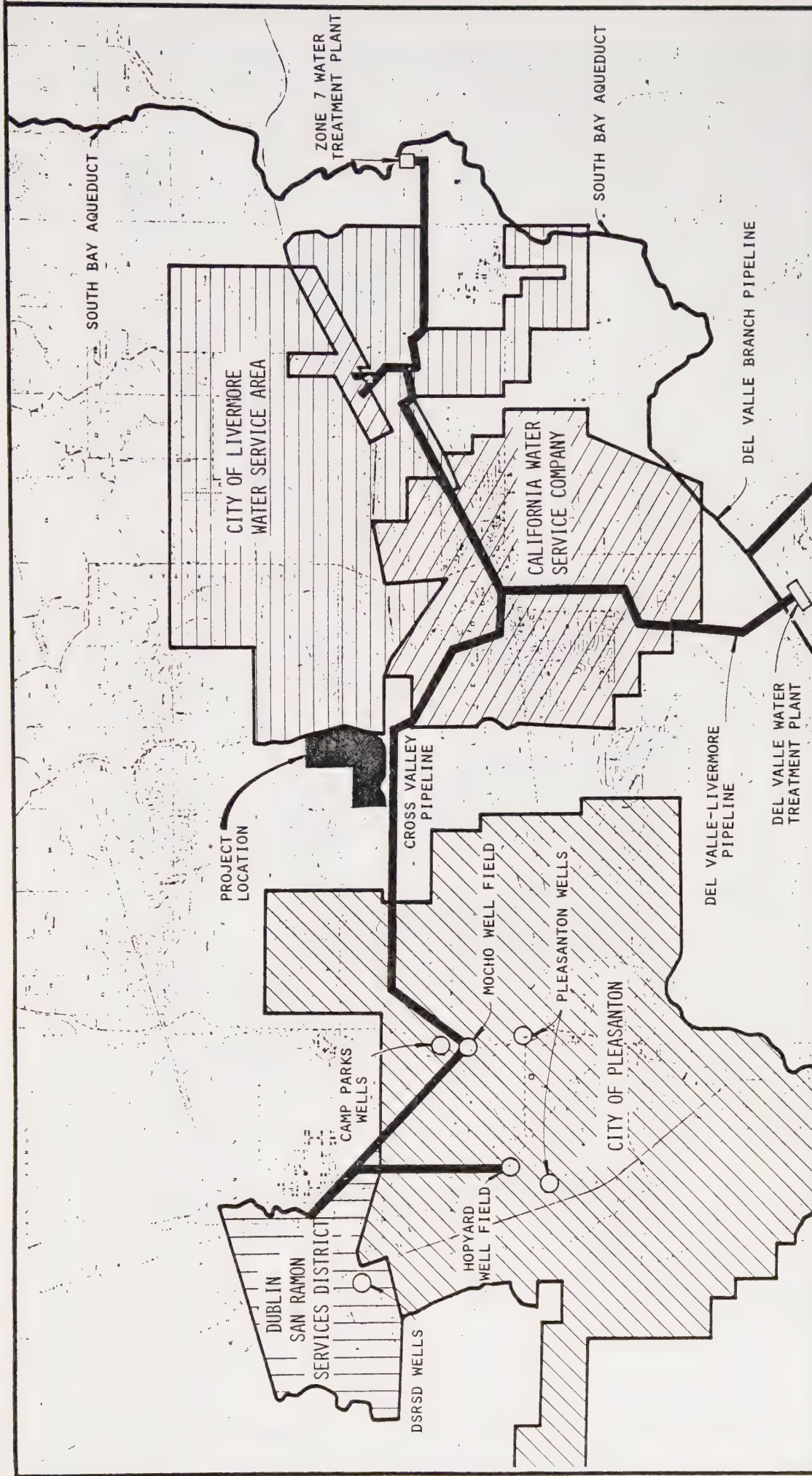
NORTHBLUFF
DEVELOPMENT



AIRPORT
FLIGHT PATTERN
ALAMEDA COUNTY
PLANNING DEPARTMENT

November, 1981

FIGURE 23



**NORTHBLUFF
DEVELOPMENT**

November, 1981



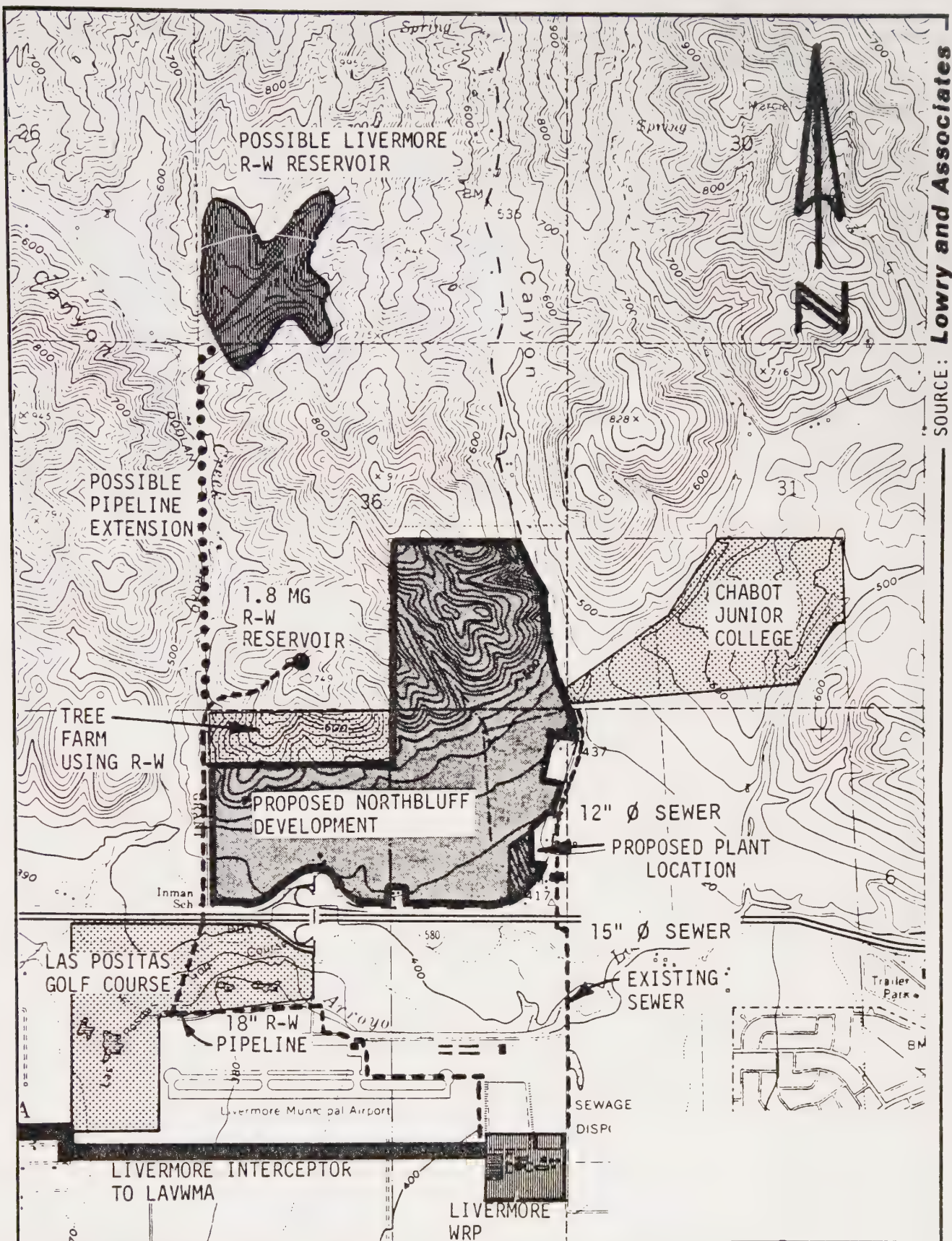
Water Purveyors & Facilities

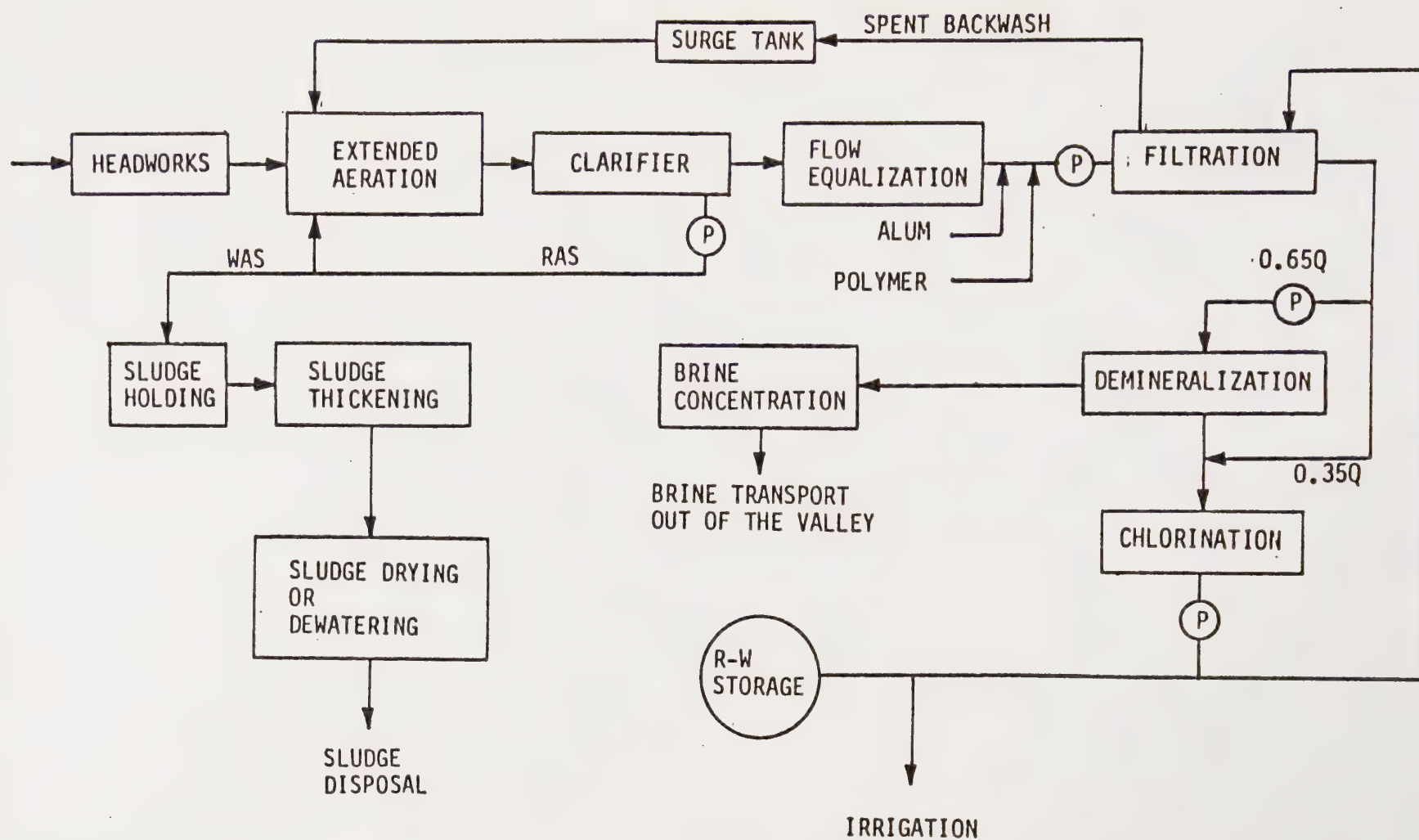
ALAMEDA COUNTY

PLANNING DEPARTMENT

SOURCE: LOWRY & ASSOCIATES

FIGURE 24





NORTHBLUFF
DEVELOPMENT

November, 1981

SOURCE: LOWRY & ASSOCIATES

Wastewater Flow Diagram
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 26

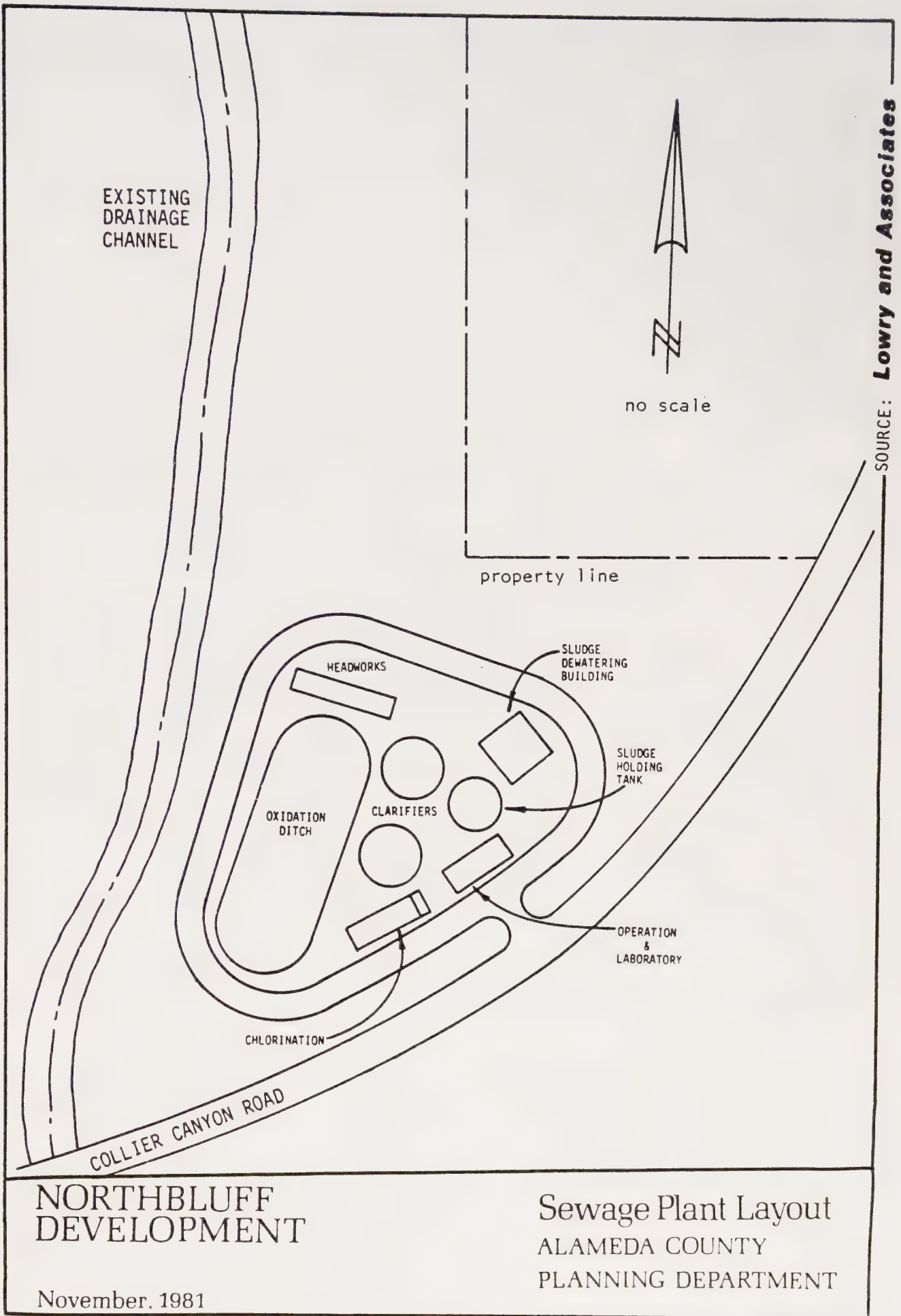


FIGURE 27

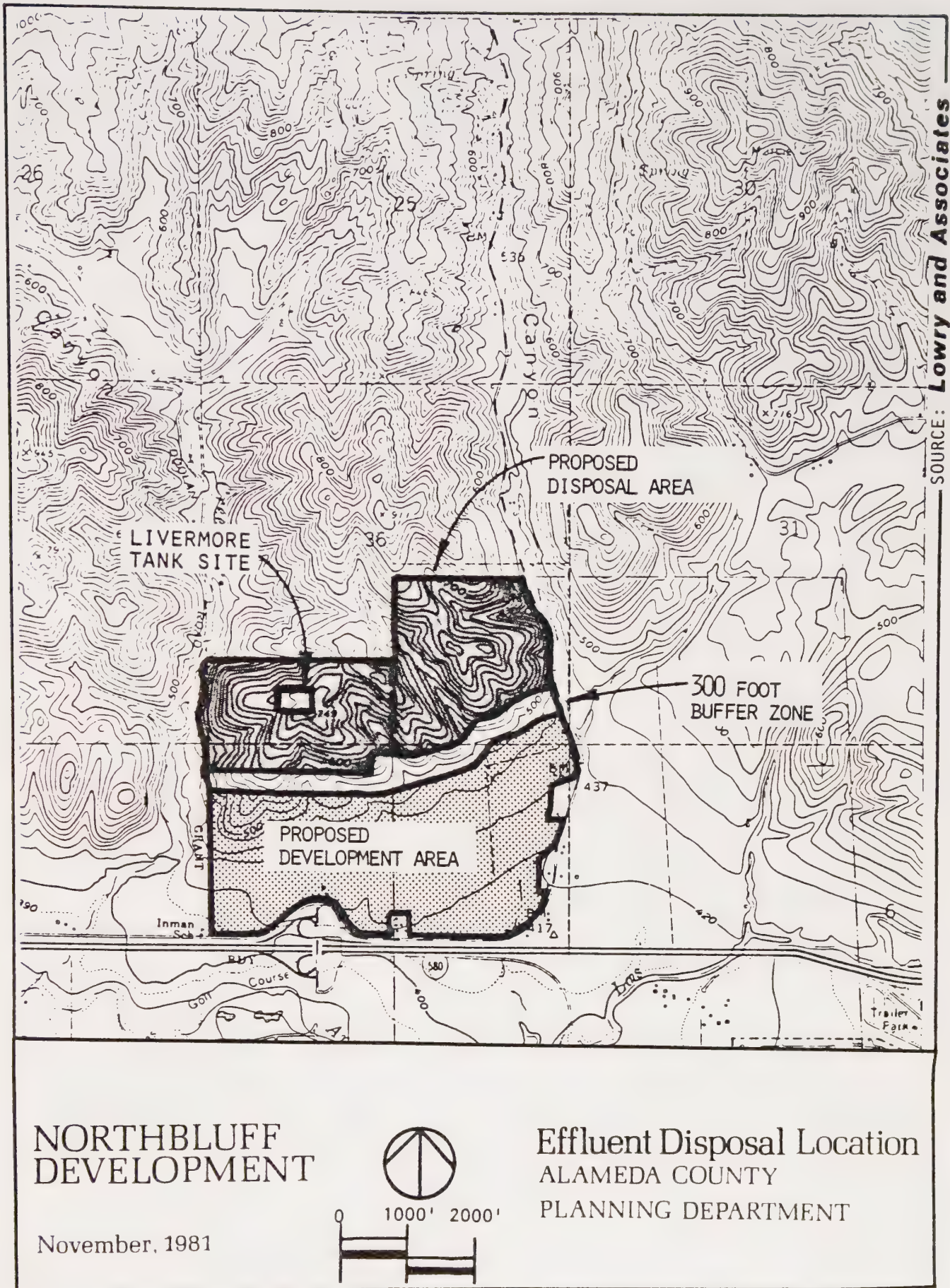
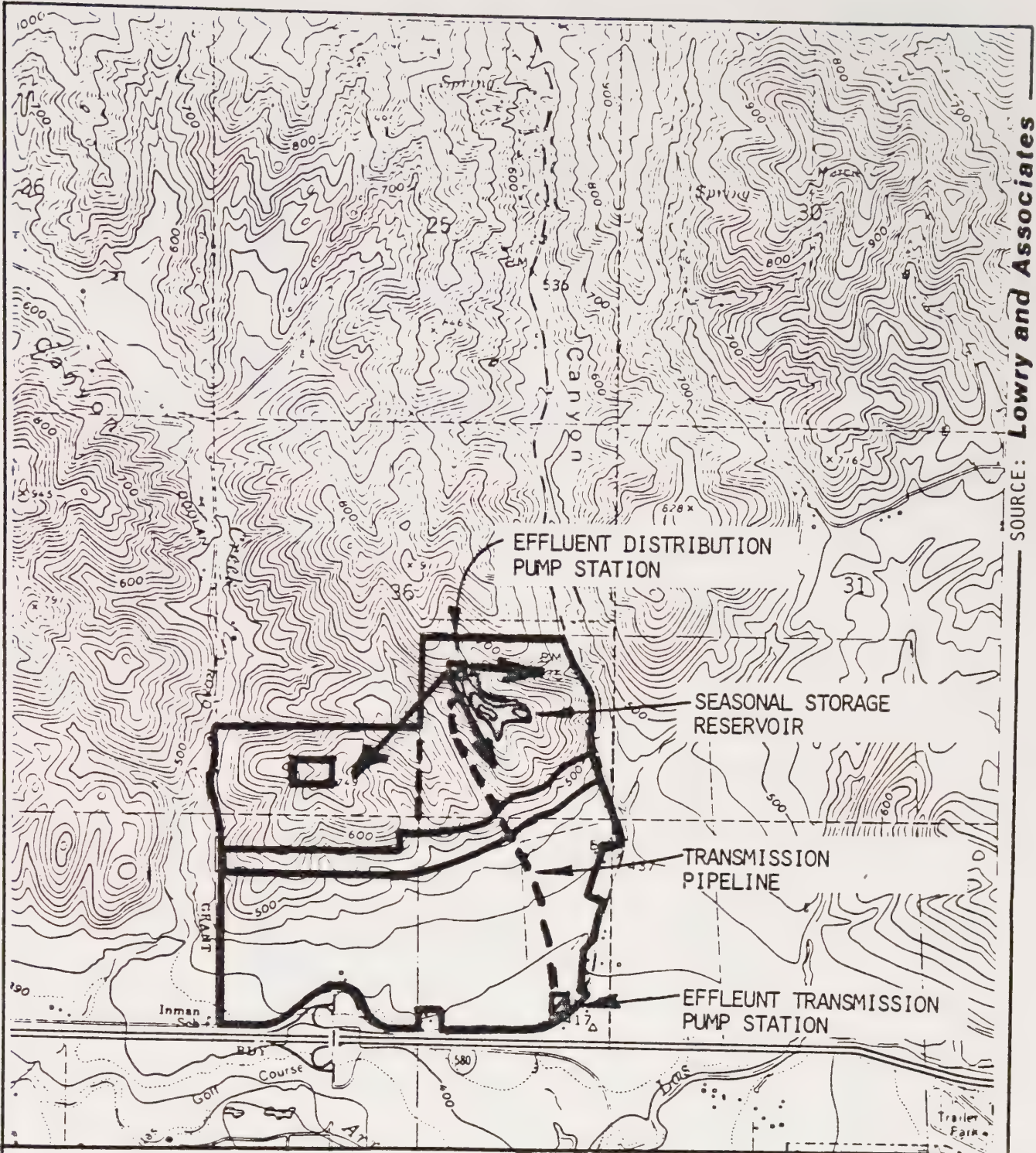


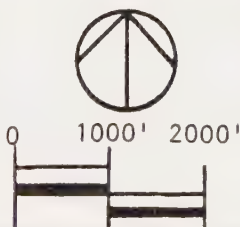
FIGURE 28



SOURCE: Lowry and Associates

NORTHBLUFF DEVELOPMENT

November, 1981



Effluent Disposal Facilities
ALAMEDA COUNTY
PLANNING DEPARTMENT

FIGURE 29

WASTEWATER CHARACTERISTICS

	Livermore's 1978 Average WRP Quality			Projected Quality for Northbluff Wastewater				
	Influent	Secondary Effluent	Filtered Effluent	Influent b)	Secondary Effluent	Filtered Effluent	Demineralized Effluent RO Permeate	Blended c)
BOD ₅	274	12.6	5.0	275	<30	-	-	-
Suspended Solids	251	19.5	4.7	275	<30	-	-	-
Turbidity (JTU)	-	-	4.1	-	-	2.0	0	<2.0
pH (units)	7.4	7.0	7.4	7.5	7.5	7.5	7.5	7.5
TDS	675	-	813 a)	520-800	520-800	520-800	50	220-320
D.O.	-	-	6.4	-	2.0	2.0	2.0	2.0
Ammonia as N	-	2.5	1.4	15	-	-	-	-
Nitrates as N	-	-	14.7	-	15	15	0.8	6
Chlorides	169	-	200	70-109	70-109	70-109	2-3	26-41
Sodium	-	-	189	73-109	73-109	73-103	4-5	29-40
Potassium	-	-	14.9	7-15	7-15	7-15	0.4-0.8	<1-6
Calcium	-	-	83	83	83	83	1-2	31-37
Magnesium	-	-	100	60-80	60-80	60-80	1-2	22-29
Boron	-	-	1.7	0.25-0.55	0.25-0.55	0.25-0.55	0.2-0.4	0.2-0.4
Coliform (MPN/100 ml)	-	-	<1.9	-	240	<2.2	0	<2.2
Temperature °C	-	-	18.0-26.1	15-25	15-25	15-25	15-25	15-25
Phosphate	-	-	23	23	23	23	0.2	8

a) 1978 data indicate a reduction trend. This supports Zone 7's policy toward increased use of SBA water with lower TPS levels. 1979 Avg. = 733.

b) Based on SBA and Zone 7 water treatment plant water quality with increments picked up in domestic sewage.

c) Based on 67.5% of total flow processed through R.O.

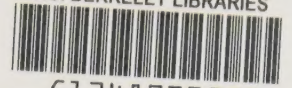
NORTHBLUFF DEVELOPMENT

November, 1981

Wastewater Characteristics ALAMEDA COUNTY PLANNING DEPARTMENT

SOURCE: LOWRY & ASSOCIATES

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